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WHEN AND HOW DID WE GET OUR TEETH?*

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THE following studies are presented in this paper in answer to the title questions. A study of the teeth and shell of the claw of: 1. An invertebrate—the American lobster, *Homarus americanus*. A study of the teeth and bone of: 2. A small shark, *Mustelus canis*. 3. The ten-pounder, *Elops saurus*. 4. The bowfin *Amia calva*. 5. The sunfish, *Lapomis pallidus*. 6. The lake trout, *Salmo ferox*. 7. The garpike, *Lepidosteus*. 8. The catfish, *Siluridae*. 9. The mascalonge, *Esox*.

A plan is the first requisite of a mechanical device intended for a definite purpose. From observation, we are certain that the teeth are subject to a great variety of stresses applied in many directions and must require definitely planned mechanical devices to meet such stresses successfully. In our endeavors to understand these devices, we naturally turn backward toward the beginning of tooth history in search of the original plan of tooth construction.

In form and general character, the tooth appeared very early in the history of animal life. The small mollusk, *(Nucula)* of the Lower Silurian age—and a contemporary of the trilobite, has interlocking teeth in the hinge that locks together the two symmetrical shells. These teeth, however, could hardly be considered as representative teeth with such a

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*This is a condensed report of Dr. Foote's work for the year. A detail report is on file with the Research Commission.

limited purpose. In somewhat later invertebrates—*Arthropoda*—we find organs of a wider application as teeth and we may conveniently begin the study of teeth here.

A report of the work done on the shell, teeth and bone of the above mentioned animals is given below in the form of brief abstracts of the studies pursued.[1]

THE PLAN AND STRUCTURE OF TOOTH AND SHELL OF THE ARTHROPOD HOMARUS AMERICANUS—THE LOBSTER

The lobster, an invertebrate, is interesting in this connection, as it antedates in animal history the teeth and bone of the vertebrate series and may be expected to reveal the plan according to which the later teeth are constructed. In the affairs of life, the plan is biologic and, hence, remote in origin; but such a plan was perfect enough in its original design to meet the requirements of all time. An indefinitely long period may be and is required for the working out of a biologic plan, but when it is completed, it does not fail in its original intention, although it may be thwarted by the introduction of some external force applied at some point in its developmental experiences. The tooth and shell of the invertebrate are analogous to the tooth and bone of the vertebrate.

The strange association of animal life with calcium was first noticed in the calcium carbonate shells of the mollusks and trilobites of the Cambrian period, and then phosphorus was gradually introduced into the shell, as in the crustacean lobster, producing a calcium phosphate shell. These two calcium compounds have survived as the essential inorganic constituents of animal life from the beginning to the present time and are found in the tooth, shell and bone of present animals, thus giving to these organs a history of great antiquity and a great significance.

The tooth of the invertebrate lobster is merely a modification of the shell structure architecturally designed on a truss model and placed on an elliptic shell base for the purpose of great crushing capacity. The shell (calcium carbonate and calcium phosphate with 3.76 per cent phosphates) is composed histologically of a large number of concentric laminae (the outermost of which is pigmented), resembling somewhat the epidermis of the skin in arrangement. The shell is perforated by many small holes admitting the passage of small groups of bristles. The tooth is a protruding arch of the shell; the laminae of the shell being extended around the arch or tooth as zigzag laminae embedded in a dense inorganic matrix of flintlike hardness, the whole forming a mechanical truss of the most perfect construction. In some cases, the claw teeth are composed of the same laminae, so arranged as to form sharp-pointed, straight or curved cones well adapted to seizing and piercing. Thus, we see how mechanical structures of an invertebrate are worked up into useful devices for such functional services as the various stresses of future teeth may require.

THE BONE, TEETH, SCALES AND FIN OF A SMALL SHARK, MUSTELUS CANIS

The small shark, *Mustelus canis,* belongs to the elasmobranch or cartilaginous group and the endoskeleton is an irregular calcified cartilage instead of bone; while the external covering is more like enamel and dentin than it is like a dermal structure.

1. For a more detailed account, with illustrations, see the original articles as they appear in THE JOURNAL, or address the secretary of the Scientific Foundation and Research Commission.

As the fish appeared in the following order of development—the cartilaginous, ganoid and teleost or bony fish—we may expect to find early teeth and bone formations, and in this we are not disappointed.

Calcified cartilage is very interesting on account of its forecast of bone that appeared later as the foundation of the vertebrate series. There is a peculiar and suggestive relationship of calcified cartilage, as seen in the early fish, to the calcified cartilage that always precedes true bone formation in man. This may be briefly outlined as follows: The long bones are first laid down in hyaline cartilage; a center of cell activity is established at one or more points of the shaft and extremities; a calcification of the cartilage matrix follows, which is soon absorbed by vascular osteoblastic tissue, and this, in turn, is followed by the production of true bone by the agency of osteoblasts or bone cells; that is, the formation of true bone in man, finds its archetype in the formation of bone in the early fish, which throws a flood of light on the obscure process of the bone formation of the later mammals.

Again, it is observed that the calcified cartilage of the fish is enclosed between two layers of keratinized, or horny tissue, which is indicated by a sulphur lead reaction, thus associating calcium compounds with a keratin compound, which is an epidermal compound, and in this we can see the early relation of the stratum corneum of the epidermis of the mouth, which is keratinized tissue, with the enamel of the teeth. The irregularly cone-shaped teeth have an enamel tip of flintlike hardness, a shaft of dentin and a central chamber containing an extensive circulatory distribution. The scales have practically the same structure, again, showing the early association of skin structures with calcium compounds. Hence, it may be seen that enamel and dentin appeared in animal history before bone and that their respective cells, the ameloblasts and odontoblasts, were the dominant secreting cells of that early period rather than the osteoblasts or bone cells. The relation of life to the inorganic world is strange indeed; that it would ever be possible for a living cell to create limestone is almost beyond belief, and then to introduce a sulphur compound in addition to the calcium compounds in the construction of the framework of the animal body adds to the difficulty of belief. Calcification is not a finished physiologic result of normal cells. The three cells, ameloblasts, odontoblasts and osteoblasts, introduce three physiologic activities recognized in amelification, odontification or dentinification and ossification as constructive agencies in the history of life and displace calcification, which is a pathologic process of degeneration. The extension of calcium compounds from the shellfish to man as a serviceable means of general usefulness has a constructive value in animal life that is equal to that of the foundation of a building. He would be considered a poor builder who disregarded the character of his foundation or who does not know, from any research that he has made before he begins to build, whether or not any material for foundation purposes is available. The placental offspring derives its calcium from the bloodplasma of the mother; if she does not have it, the offspring cannot receive it, and is, therefore, born with an imperfect, feeble foundation indicated by its bone and teeth failures. How often do we know the true calcium value in the mother?

Calcium carbonate established shells, calcium phosphate, bone and dentin, keratinized tissue, enamel, stratum

corneum, hair, horn, nails and feathers, and all of these are potential possibilities in the progressive development of vertebrate life and received their initial impetus at the beginning.

THE BONE AND TEETH OF THE TEN-POUNDER, ELOPS SAURUS

The ten-pounder represents a primitive member of the teleost group of fishes, when bone had, for the most part, replaced hyaline cartilage and calcified cartilage in the histology of the inorganic organs of the body.

Bone is a product of the bone cell and not of the cartilage cells; from cartilage to bone is an elevation of the biologic level in the scale of life, and as the change from the former to the latter took place very slowly, it might be expected that some remaining evidences of normal or calcified cartilage would still be found in the primitive teleost, and this seems to be the case in the ten-pounder.

The teeth are sn...ll, curved sharp-pointed, with relatively large central chambers containing blood vessels derived from the jaw bones. These vessels extend lengthwise of the pulp chambers and send off minute lateral branches, which form the dentinal tubules on which the dentinal substance depends. The teeth have enamel tips united to the dentinal shafts, which are ankylosed to the jaw bones. In the primitive teleost fishes, the dentin shows a higher degree of advancement than the bone. As soon as dentin appears at all, it seems to be fully differentiated, with no evidence of an antecedent stage, which bone has.

Dentinal substance, like a secretion, is complete as soon as secreted, and, therefore, shows less variation than bone. The enamel substance, also a secretion, shows little or no differentiation.

The ten-pounder is especially interesting because it introduces us to the distinct departure of the vertebrate from cartilage to bone and calls attention to the continued association of bone and keratinized tissue in the formation of such important organs as the fins and teeth.

THE BONE AND TEETH OF THE BOWFIN AMIA CALVA

The bowfin is one of the existing survivors of the ganoid fishes which extends backward in geologic history as far as the Silurian age. The fish is interesting on account of its prehistoric ancestry and its close relation to the line of ancestry of all the higher bony fishes. It may, therefore, be expected to show early structural types of bone and teeth and their histologic relations to each other at an early period of vertebrate history.

It is assumed in these studies that an early type of bone is associated with an early type of teeth, for the reason that kindred tissues develop at an equal rate unless some preventive measure arises that checks one or the other.

A peculiar feature of this specimen is that there is seen no line of demarkation between the jaw bone and the teeth, but the dentin of the tooth seems to be an outgrowth of the bone. Although this is the only specimen so far observed that suggests the origin of dentin from bone, there seems to be no really good reason why such an origin is not possible as both bone and dentin producing cells seem to arise from cells within the blood vessels, indicating a common origin and kindred relationship. The difference between bone substance and dentinal substance is, after all, one of density. They are distinguished microscopically by their lacunae, canaliculi and tubules, chemically by percentages of calcium salts. Only a very small portion of the tooth—the so-called enamel—represents the physiologic death and hard-

ness that give character to cells of the stratum corneum of the skin. This may be due to an enormous percentage of calcium salts in the original ameloblastic product and its subsequent concentration. The teeth of both jaws indicate the same form of origin.

THE BONE AND TEETH OF THE SUNFISH, LEPOMIS PALLIDUS

The sunfish is a primitive member of the highest group of teleosts or bony fishes.

An interesting feature is seen in the scales, in which are found small, triangular areas of small, sharp teeth on the exposed surfaces and projecting beyond the edges of the scales. Comparing one of these teeth with a tooth of the mouth, the following resemblances and differences are noted that are significant: in both, the tips are homogeneous; in the scale tooth, the tip is not always sharply indicated by a line of demarkation, in the oral tooth it is; in the scale tooth, there is no evidence of a central chamber as there is in the oral tooth. The scale tooth is an upward extension of one or of the concentric laminae that form the body of the scale. The scale tooth is, therefore, a tooth in shape and general appearance but not in structure.

Physiologic death has a purpose of great value in animal life as may be seen in the epidermis of the skin. The cells of the stratum mucosum of the epidermis are living, actively dividing cells. As they multiply, they push their way by the force of accumulation toward the surface, and on their way they receive from the stratum granulosum and stratum lucidum a keratohyaline incorporation; and as they become cells of the stratum corneum, they are flattened, lifeless, keratinized cells of the nature of horn (whence the name stratum corneum) for protective purposes. A callus is an intensified example of such a physiologic death and protective purpose. There being no blood supply, the cells become, by concentration, hard and hornlike. A similar concentration of inorganic compounds may account for the formation of tooth scales of the fish.

THE BONE AND TEETH OF LAKE TROUT, SALMO FEROX

The bone of the lake trout has lost all cartilaginous characters of the earlier types of fish and appears as a bony fish in the process of development. The mouth is well supplied with teeth, which are ankylosed and show distinct evidences of shedding, which may be taken as further indication of a general as well as a local development.

Taken by itself, the shedding of teeth has no significance, but as an evidence of developmental processes in operation throughout the body, it has the greatest importance; a failure to shed the teeth in those vertebrates in which it has been established in phylogenetic history means a serious general disturbance. Some strange examples of variation in tooth shedding occur in the lower vertebrate, which may be repeated in the course of higher developments by means of the bone extension; for instance, fetal whales have teeth, adult whales have none; unborn calves have teeth, which never come through the gums.

We see in the fish the early appearance of tooth shedding, which gives it a great physiologic value, as it has been extended from one end of the vertebrate series to the other.

The interesting features of this fish are the various bone differentiations and shedding of the teeth as evidences of development.

THE BONE AND TEETH OF THE CHANNEL CATFISH, SILURIDAE

The bone and teeth of the channel catfish are especially interesting on account of the various differentiations of

bone that they present and their relations to the teeth and to the circulatory system. We realize that we are in the bone-making series following cartilaginous development. The bone sections are taken from a variety of situations as the dorsal vertebra, the osseous oral membrane of the upper jaw, the lower jaw and the dorsal and pectoral fin. The teeth are taken from the osseous membrane of the upper jaw, from the lower jaw and from the fins.

These different locations give a fair idea of the stage of development of these organs and of the animal as well.

The bone sections show differentiations varying all the way from the early multipolar bone cell to the later lamellar and laminar bone type. The teeth are ankylosed to the bone of the lower jaw, but on the upper jaw they are attached to an osseous, oral membrane, which, in turn, is attached to the jaw bone. The lower jaw bone is better developed than the upper, and the ankylosed teeth of the lower jaw are better developed than those attached to the upper oral membrane. The more highly developed the bone, the more perfect the organization of the teeth, as observed in comparing the upper and lower jaw bones and teeth of any vertebrate class.

THE BONE AND TEETH OF THE GARPIKE, LEPIDOSTEUS

The garpike is literally a bone and teeth fish, having a craniovertebral axis, external scaly covering and fins of bone, and an immense number of teeth of various sizes on the entire under surface of the upper jaw and on the lower mandibular ridges. The whole mouth is set with teeth excepting the floor between the diverging rami of the lower jaw.

Just why this animal requires so much of the inorganic constituents of life does not appear, unless there has been a rise, culmination and decline in the cycle of animal history, and at the point in that history which is indicated by this fish, the culmination reached its highest percentage of inorganic compounds and began its period of decline.

It looks as though Nature had determined to make an animal out of calcium salts and then had regretted the determination and concluded to use these salts in the construction of an organized calcium framework of the body. In these early bone structures we seem to be conscious of a universal cell endowed with the capability of adaptation to various uses by a specific biologic law operating through a long animal series. Perhaps the type of universal cell would be best represented by the germ and sperm cell product of fertilization, in which the cell, acting under a general biologic law, produces epithelial, connective tissue, and muscular and nervous tissue cells—a wonderful community of correlated interests that we call the animal body.

The influence of the earlier bone type of the cranial bones on the upper teeth may be an important one when compared with that of the later bone type of the lower jaw on the lower teeth, and more especially in the latest mammal, which is so far removed from the formative period of organization.

The teeth are very numerous, their number defeating any explanation that is forthcoming. They are all ankylosed to the jaw bones, differing in this respect from the teeth of the Great Northern pike. In the garpike, the blood supply of the teeth is derived from the jaw bone, while in the Great Northern pike it is derived from the oral membrane external to the teeth.

In the garpike, shedding takes place at the line of ankylosis; in the Great Northern pike, it occurs at the junc-

tion of the shaft with the base. The term ankylosis means a bony union between bones forming a joint, and this would imply the existence of a joint preceding the ankylosis. The term, therefore, is really a pathologic one as applied to later bones, but it serves to show how a physiologic process during the formative period of life may become a pathologic process in the late period of life. There are fish with jointed teeth, as the Great Northern pike, and if the existing joint is understood to precede ankylosis, the Great Northern pike would precede the garpike in biologic history.

Ankylosis of a tooth to a bone requires a bone connection between the tooth and bone, and as the essential part of a tooth is dentin, it is necessary that the dentin be covered with bone. Bone may be attached to bone by ankylosis or by intervening connective tissue, as, for example, in the tooth of the late mammal, where cementum, which is bone, surrounds the dentin and thereby completes the bone plan with an intervening connective tissue.

The fins of the garpike are composed of bone substance, with multipolar bone cells showing an early type of bone. Thus, we have, in this fish, an animal in which inorganic products predominate. It is a bone and teeth animal beyond apparent needs. The bone and teeth represent types of differentiation, the teeth being further advanced than the bone. This has been true throughout this investigation. Enamel and dentin appeared before bone, and in a condition adapted to their final uses. Ankylosis of bone to bone, the covering of dentin with bone, the shedding of the teeth in obedience to the biologic law of advancement began very early in vertebrate life, and they have all been extended to man, presenting, in many cases, satisfactory explanations of certain physiologic variations that are hard to understand.

THE BONE AND TEETH OF THE MASCALONGE OF WISCONSIN WATERS, ESOX IMMACULATUS

We know that, in the final differentiation of bone as we see it in the latest mammals and man, there are three types of bone—the first or lammelar, the second or laminary and the third or haversian system—and that these types must have had a beginning in the early history of vertebrate life; and since they did not all begin at the same time, but appeared in orderly succession through past ages, we may take these types as measures of development or advancement in animal life. We have also seen, in the earlier fish of this series, undifferentiated bone substance or the mother substance from which all types are derived, so that we have a biography of bone written in terms of differentiation and development, in the fishes, amphibians, reptiles, birds, mammals and man.

Having found such a biography of bone, we are now in search of a similar biography of the tooth. In this, we are assuming that bone and teeth are kindred tissues by virtue of their inorganic relationship and that kindred tissues advance with equal step. As the bone is, so may the tooth be.

If we study the bone and teeth of the mascalonge with this thought in mind, we may discover a harmony of differentiation and development that will throw some light on the harmonies and disharmonies of later life as they are recognized in man.

The cranial bones have a clear bone substance in which are numerous segments of minute blood vessels, capillaries, clefts or channels, and within these are endothelial cells that must se-

crete bone substance and enclose themselves in it as there are no lacunae or canaliculi to be found. This indicates that bone substance is produced by living cells in the circulatory system, or, in other words, that endothelial cells may become osteoblasts—a legacy extended from those remote and ancestral cells referred to above that had the power to secrete calcium carbonate by virtue of their individual endowments. This associates blood and bone very closely in the affairs of life.

In the lower jaw, the plan of architecture is a finished plan and the lamella, lamina and haversian system are in evidence in different stages of development. The three bone types—lamellar, laminar and haversian system—are mapped out, which makes the lower jaw a more highly organized bone than the upper jaw; and, on the basis of the equal progression of kindred tissues, we might expect to find better teeth on the lower than on the upper jaw. The clinical experiences of dentists with the later teeth of man would be of value in this connection. In cleft palate, are the lower teeth in any way affected? In orthodontia, is the work of correction applied to the teeth of the upper jaw more than to those of the lower jaw? In the stress of life, are not the lower teeth more enduring and, therefore, better teeth than the upper teeth? The teeth of this fish are very numerous, and are teeth by location and appearance rather than by exact definition. They are ankylosed or hinged; each tooth has a tip, shaft and base, and presents three organizations: enamel, dentin and bone. The interesting features about the teeth are the shedding of the old and the formation of the new teeth.

As the teeth of the lower jaw are shed, the new teeth are established by the sides of the old teeth instead of underneath and in place of them, as occurs in some of the amphibians and in the late mammals. A loose, vascular membrane is attached to the inner and upper surfaces of the jaw bone, which is a tooth-forming membrane, the bone itself taking no part in the process. It has an inner and outer layer enclosing a trough-like cavity. Fibrous, vascular buds arising from the inner layer produce new flattened, cone-shaped hollow teeth, which are firmly attached to these buds. Then there is a gradual transformation of the fibrous buds by an ossifying process beginning at their distal ends. This brings the new teeth to a vertical position by the sides of the old teeth. The new teeth, thus formed, become the shafts of the second teeth, so that the dentinal portion of the tooth is formed first. Then, the fibrous bud extensions at the base of the new tooth are transformed into an osteodentin, which becomes the base of the tooth and is then ankylosed to the jaw bone. The blood vessels of the fibrous bud extensions are enclosed as the osteodentin is formed and remain as the blood vessels of the second teeth. Following the ankylosis of the new teeth, the shafts of the teeth separate from their bases, and, gradually becoming granular, wear away, down below the surface of the jaw bone. Thus, there are three main processes involved in the formation of the second teeth of this early vertebrate: (1) the formation of the tips and shafts from the fibrous bud extensions of the oral membrane of the mouth; (2) the transformation of these extensions into a compound ossified substance and their fixation, by ankylosis, to the jaw bone, and (3) the shedding of the old teeth.

Comparing the tooth formation of early vertebrate history, as seen in the group of fishes above mentioned, with the tooth formation of the latest mam-

mal, man, although they are millions of years apart historically, there are some fundamental points of resemblance which are interesting:

TOOTH FORMATION IN THE EARLY VERTEBRATE

1. Formation of enamel substance from the oral membrane.
2. Formation of a vasodentin from connective cells.
3. Formation of osteodentin from vasodentin.
4. Formation of dentin from osteodentin.
5. Ankylosis of tooth to jaw by ossified connective tissue.
6. Wearing away of the old teeth.

TOOTH FORMATION IN MAN

1. Formation of enamel substance from the oral epidermal cells.
2. Formation of dentin and pulp from connective tissue.
3. Formation of cementum by ossified connective tissue.
4. Union of cementum and alveolus by connective tissue instead of ankylosis.
5. Displacing the first teeth by the second.

From the foregoing account of bone and teeth of the early vertebrate representatives, we have seen bone and teeth in the making. We have been able to follow in the individual sections, the stages of progress as they appeared, and are now better able to appreciate the possible changes or variations that belong to a continuation of type developments under the same biologic laws that were responsible for their initiation. Having the beginning of the vertebrate series in the fish and the end in man, we can account for the values of intermediate stations of progress between these two extremes. To progress from fish to man by way of the amphibians, reptiles, birds and mammals is a more logical method of procedure than to leap from the former to the latter with no consciousness of any form of life between them, or to consider the latter on its own merits without regard to any antecedent history.

When we ask the question, therefore: "When and how did we get our teeth?" we may look for the answer in the answer to the greater question: "When and how did the vertebrates get their teeth?"

The studies of the bone and teeth of the primitive members of the class of fishes lead to the following conclusions, which have an interesting bearing on certain tooth problems of man.

CONCLUSIONS

1. Calcium carbonate was secreted by cells of mollusks for protective reasons as far back as the Lower Cambrian period of the earth's history; which declares its antiquity as an associate of protoplasm in the history of life.

2. Phosphorus was pressed into the service and a calcium phosphate shell was introduced as a protective covering of another class of invertebrates.

3. Calcium carbonate and calcium phosphate have survived as the essential inorganic constituents of animal life from the beginning to the present time, and are found in the shell, tooth and bone of animals because they satisfactorily answered the requirements of those organs.

4. An organic keratin compound secreted by epidermal cells was added to the calcium compound by association and thus, calcium carbonate, calcium phosphate and a keratin compound formed a triple alliance for the general purposes of protection and resistance to mechanical stresses of all kinds.

5. Having obtained these three com-

pounds by the endowment of three cells, we are able to account for the shell, tooth, bone, hair, nails, feathers and epidermis of the animal kingdom.

6. Logically, the character of these products of cell life will depend on the integrity of the cells producing them.

7. Enamel substance was first secreted by epidermal or epithelial cells, dentinal substance and bone substance, by connective tissue (possibly endothelial cells).

8. These substances, by organization, become enamel, dentin and bone.

9. Hyaline cartilage and calcified cartilage were necessary antecedents of bone.

10. Bone and teeth have been intimately associated by family ties since they both appeared as members of a protective union, and the success or failure of one is an indicator of the success or failure of the other.

11. Unsound bone and sound teeth or sound bone and unsound teeth are not harmonious biologic relations.

12. The lower teeth are better teeth than the upper because the bone of the lower jaw is a better and higher type of bone than that of the upper jaw.

13. The usefulness of enamel, dentin and bone depends on the physiologic integrity of three cells: ameloblasts, odontoblasts and osteoblasts, and these three cells derive their energy from the same blood stream that has received elements from unlike ancestral sources, and a standard tooth or bone with which all other teeth and bone may be compared is not to be expected.

14. Tooth shedding began in the invertebrate and has been extended into all vertebrates as an evidence of animal development.

15. The great number of variations in functions, food, environment and ancestral legacies since the tooth first appeared in animal history has had something to do with the present disturbances of the tooth in man.

16. The length of time during which an organ will maintain its original standard depends on the character of its organization.

EARLY SIGNS OR MARKINGS FOUND ON THE SEPTAL GINGIVAE AND GUMS, INDICATIVE OF PATHOLOGIC PROCESSES

By GEORGE H. MENGEL, D.D.S., El Paso, Texas

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

SINCE 94 per cent of the cases of gingivitis start at the margin of the gum,[1] it behooves us as members of the dental profession to learn the macroscopic, pathologic changes of this important but most neglected structure in the mouth, to the end that we may conserve the investing tissues of the teeth, maintain a healthy mouth and add days, months and years of health and comfort to the life of man.

At the present time, the medical and dental professions are stressing preventive treatment and early diagnosis of diseases, knowing that an inflammation or slight change of tissue can be intelligently controlled or cured if seen in the incipient stages. We must recognize the fundamental fact, stated by Dr. G. V. Black,[2] "Preventive treatment must be by the general practitioner of dentistry. It will, I think, be realized that the treatment of the beginning of the disease of the gingivae belongs to the general practitioner of dentistry in just the same way as the correction of the abuses of the gingivae belongs there. The first element of this is the watchfulness of the practitioner for the beginning injury. In the very nature of things, this must be discovered by the general practitioner and not left to the specialist. The rule has been that the specialists do not see these cases early enough to apply preventive treatment."

I am not antagonistic to the man limiting his services to the treatment of gums, because I believe he renders a valuable service for which there is great need.

To emphasize the prevalence of gingivitis: Dr. Arthur D. Black says:[3] "In examining the mouths of five hundred patients between the ages of twenty and thirty-five years of age, only five per cent had no gingivitis. The remaining four hundred seventy-five had an average of eight and fifty-three hundredths areas of gingivitis."

1. Talbot, E. S.: Interstitial Gingivitis, Toledo, The Ransom & Randolph Co., 1913, p. 183.

2. Black, G. V.: Special Dental Pathology, Chicago, Medico-Dental Publishing Co., p. 187, 1916.

3. Black, A. D.: Dent. Cosmos, 60: 1219, 1913.

Quoting from Stillman and McCall:[4]

The recognition of early symptoms of incipient diseases is more difficult. And it is just here that the dental profession may render service within the field of preventive medicine, which will be of inestimable value to humanity. To detect the presence of disease conditions in the gingivae and lesions of the enamel tissue seems to us, as dentists, to be very simple. On the other hand, it is a fact that most dentists, at the present time, overlook the first faint signs of periodontal disease, no matter how alert

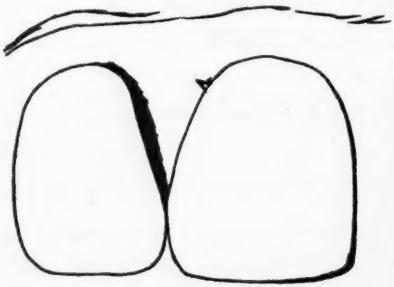

Fig. 1.—Swelling of distal surface from apex to base of septum with slight indentation or Stillman's cleft on mesial surface near base, in a boy, aged 8 years.

Fig. 2.—Swollen septal gingivae between upper right lateral and central incisors, showing base line, in a girl, aged 10 years.

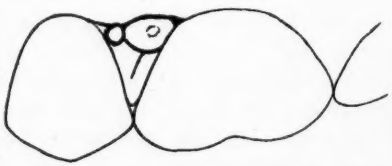

Fig. 3.—Septal gingiva between upper left molar and bicuspid with apex rounded, showing base line, also globular markings, in a girl, aged 13 years.

Fig. 4.—Gingival margin of right lateral incisor swollen with small globular marking, in a girl, aged 12 years.

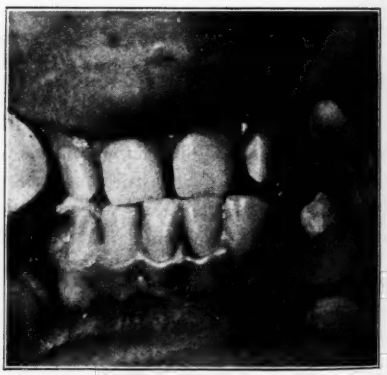

Fig 5.—Swollen and loosened septal gingiva between mandibular centrals, in a boy, aged 11 years.

4. Stillman, P. R., and McCall, J. O.: Clinical Periodontia, New York, MacMillan Company, 1922, p. 105.

they may be towards the early recognition of enamel lesions. They attach but very little significance to early gingival symptoms and thereby frequently lose their one opportunity to prevent the encroachment of infection into the deeper tissues.

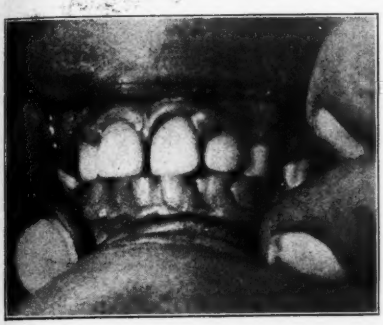

Fig. 6.—Swollen interdental papillae between maxillary central and lateral incisors, with large margin with Stillman's cleft, in a girl, aged 11 years.

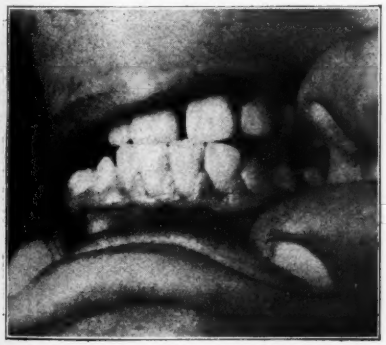

Fig. 7.—Septum between mandibular lateral incisor and cuspid, with apex rounded; base line and Stillman's cleft. The other septal gingivae are swollen with rounded apices and markings.

We are all aware how careless we are in observing commonplace objects and conditions until our attention has been called to them. Then we become interested and are amazed that we did not see them before. The area to be watched is very small—the septum or triangular gum between the

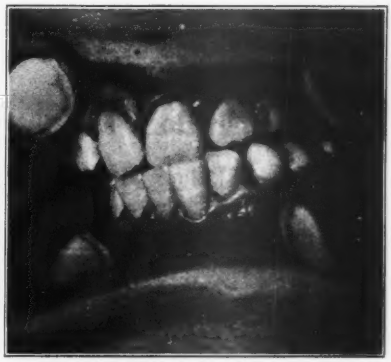

Fig. 8.—Swollen septal gingivae between maxillary left central and lateral incisors, with apex rounded; also cleft on mesial surface. The mandibular gums are also swollen; in a girl, aged 10 years and 3 months.

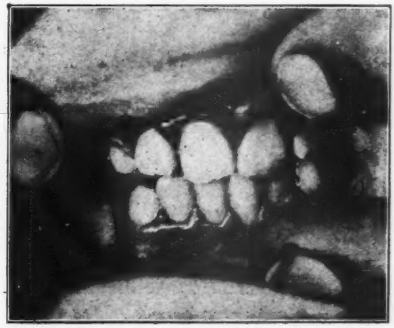

Fig. 9.—Septal gingivae between mandibular right cuspid and lateral, lateral and central incisors, swollen with globular markings, and rounded apices. The septum between the maxillary right central and lateral incisors are also swollen. (Same patient as shown in Fig. 8.)

teeth. The normal septum should be studied, and kept in mind as a control.

Disclosing solution is of vital importance to the beginner in detecting swollen and marked gums, owing to the fact that abnormal tissue is discolored more than normal, because of the débris or mold[5] accumulation over the area. It also discloses the mold on the teeth, and we find that, wherever there is gingivitis, proper brushing or cleaning has been neglected. Diag-

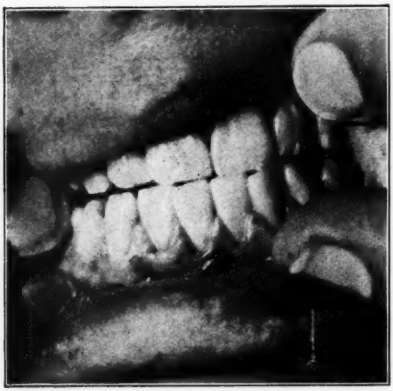

Fig. 10.—Interdental papilla between mandibular right cuspid and lateral incisors with granular surface with cleft on mesial surface, in a boy, aged 16 years. Other swollen interdental papillae are also shown.

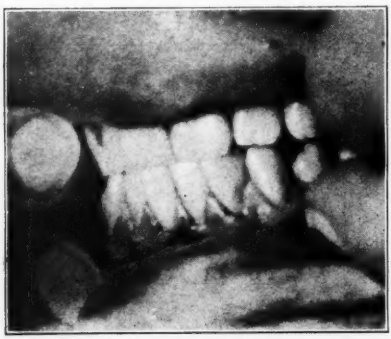

Fig. 11.—Left side of patient shown in Figure 10.

Fig. 12.—Typical case of chronic Vincent's infection with rounded glistening, swollen and loosened septal gingivae, in a boy, aged 11 years and 8 months.

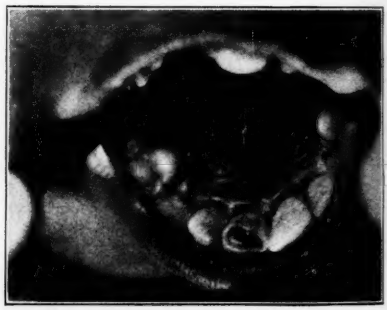

Fig. 13.—Lingual surfaces of the maxillary gums. Destruction of tissue between cuspid and bicuspid and also between right lateral and central incisors may be noted.

5. Hartzell, T. B.: Pyorrhea and Prophylaxis, Texas Dent. J. 39: 5-10 (Jan.) 1921.

nosing incipient gingivitis by differentiation in color has been difficult for many; but observation of the markings on the septal gingivae or interdental papillae[6] and margin of the gingivae, will render diagnosis easy. The inflammation or markings of the septal gingivae or interdental papillae are always more pronounced on the sides of most destruction of tissue. In all these areas, there is traumatic occlusion; a deposit of calculus; the roughened surface of the tooth or the overhanging edge of an inlay, filling or

Fig. 14.—Labial surface of maxillary gums.

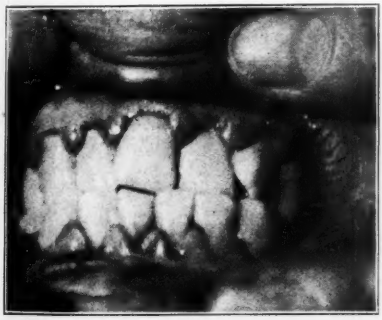

Fig. 15.—Large tumefied septal gingivae typical of chronic Vincent's infection, in a boy, aged 18 years. When pressure was applied from base to apex on the labial and lingual surfaces with thumb and finger, blood flowed from the apices of all septal gingivae. This is typical of Vincent's infection.

Fig. 16.—Destruction caused by Vincent's infection in a boy, aged 14 years and 9 months. (Patient of Dr. Wip Robinson, El Paso, Texas.)

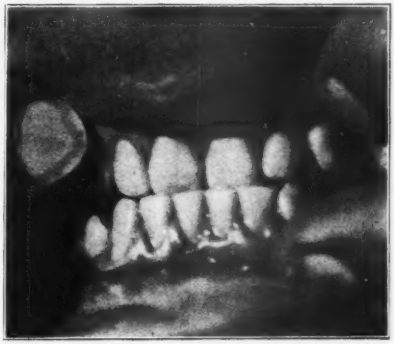

Fig. 17.—Regeneration of tissue.

6. Stillman, P. R., and McCall, J. O.: Clinical Periodontia, p. 25.

crown; or lack of proper restoration of lost tooth surface or poor contact. It is remarkable how these areas re-

Fig. 18.—Typical condition of gum found in chronic Vincent's infection, in a girl, aged 11 years. (Patient of Dr. Wip Robinson.)

sume a nearly normal condition after the surfaces of the teeth have been smoothed, the local irritants being

Fig. 19.—Lower teeth of patient shown in Figure 18.

thus removed, and traumatic occlusion corrected. These early cases can be treated successfully by demonstrating to the patient the proper brushing of the teeth and disclosing the presence of mold on the teeth and gums by the

Fig. 20.—Appearance of mouth of boy, aged 18 years, after application of disclosing solution. This patient had received instructions in proper brushing. The contrast between his teeth and those of his brother, aged 15 years (Fig. 21) who had not had instructions in brushing his teeth, may be noted.

Fig. 21.—Mouth of brother of boy referred to in Figure 20.

employment of disclosing solution, the formula for which is:

Iodin crystals	grains	50
Potassium iodid	grains	15
Zinc iodid	grains	15
Glycerin	drams	4
Distilled water	q. s. oz.	1

M. Sig. Paint gums twice a week, rinse immediately.

The method of brushing the teeth and massaging the gums advocated by W. J. Charters, of Des Moines, Iowa, is a valuable one. The patient should think of each tooth as a unit. Sixty per cent of the success of treating diseased gums depends on the proper care of the teeth given by the patient after the dentist has rendered efficient services. Whenever the gums bleed during the act of brushing, it is an indication that calculus is present, or that the teeth have roughened surfaces at or under the free margin of the gums.

Fig. 22.—Septal gingiva between left lateral incisor and cuspid with distinct globular markings, cleft on distal surface and depressed or blunt apex, which was caused by trauma on the distal edge of the cuspid, in a woman, aged 35 years. There was also calculus and mold on both teeth. The patient failed to brush this area. The septal gingiva between the left lateral and central incisors shows base line.

Fig. 23.—Calculus on central incisors and recession of gums, in a woman, aged 33. On the gingival margin of the left central incisor, an enlarged blood vessel is distinctly visible.

Fig. 24.—Lingual surface with crescent shaped margins and recession.

Fig. 25.—Swelling of marginal gingivae over bicuspid and molars caused by an accumulation of mold, in a man, aged 52.

No service rendered by a dentist is so valuable as that of correcting traumatic occlusion and thoroughly re-

Fig. 26.—Septal gingiva, with base line between molar and bicuspid; septal gingiva between bicuspid and cuspid, and cuspid and lateral with globular markings.

moving deposits from the teeth with scalers, smoothing roughened enamel surfaces at the cervical margins with files and polishing the surfaces with small curet scalers. If the surface of the tooth at first feels gritty, polishing should be continued until it is very

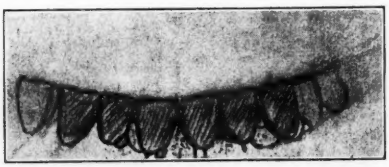

Fig. 27.—A variety of septal gingivae and fissures in the median cervical gum and margins.

smooth, the operator proceeding in the same manner until the entire circumference has been polished. Particular

Fig. 28.—Infection in nasal septum in a boy, aged 19 months, an inmate of a children's home, who contracted measles soon after arrival at home. During quarantine, he developed a virulent case of Vincent's infection, which was not diagnosed in its incipiency. He lost weight and took nourishment with difficulty. The infection was confined to the upper and lower incisors and cuspid region and nasal septum, and the upper left maxillary sinus.

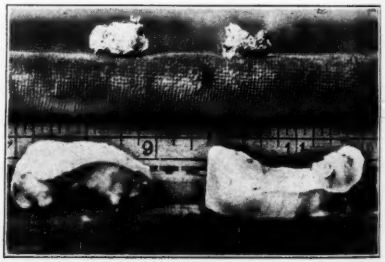

Fig. 29.—The sequestra and cast of the maxillae and mandible representing the extent of bone destruction. Sodium perborate was used in an effort to cure the condition until microscopic examination proved the absence of Vincent's flora. Potassium permanganate was then used. The child made a rapid recovery; when last seen only a small area of infection remained in the lower cuspid region, probably a permanent tooth germ.

stress should be given to smoothing the interproximal surfaces, as these are frequently neglected in an ordinary cleaning. After the teeth have been smoothed with instruments, flowers of pumice on small rubber cups and tooth polishing brushes are used and finally the surface is polished under the free margin of the gum with a pointed stick, care being taken not to neglect the interproximal surfaces.

The operator should be constantly on the lookout for Vincent's infection, relying principally on the bacteriologic examination. These germs are frequently found in cases in which slight pathologic change is visible.

The fundamental fact in the treatment of diseased gums is the early diagnosis and prompt correction of the cause.

The first change noticed is a swelling of the gingivae, which usually presents a glistening, smooth, convex surface. This condition may be very slight and only on one side. Malocclusion, traumatic occlusion, accumulation of débris or mold at this point is the cause. In the second stage there is a line of demarkation of the base line, which runs from one tooth to another. At this stage, the fibers have loosened above the line and the tissue is movable. Often we see markings without any swelling, but a contraction of the tissue above the base line. The septal gingival triangle may be subdivided in several smaller triangles or divided into several spherical areas resembling a globular surface. Others have a granular appearance. Dr. Harold Keith Box of Toronto, Canada, named these markings epithelial nodes.

Fig. 30.—Nasal deformity.

DISCUSSION

J. St. C. Bowyer, Anson, Texas: I would like to know if Dr. Mengel uses that formula as a specific in Vincent's infection.

Dr. Mengel: I wouldn't want to make a definite statement that it is a specific, but the results we have had in El Paso and other places have been very good. Dr. Henry Lotard of El Paso, Texas, was the first man to bring sodium perborate to the attention of the dental and medical profession. Sodium perborate does act as a specific in Vincent's infection.

G. C. Nixon, Youngstown, Ohio: How long ago did he do that?

Dr. Mengel: I believe it was ten, twelve or thirteen years ago. There is one thing about sodium perborate: Dentists in different parts of the country have told us they didn't get results from its use; I believe for the reason that few druggists know what sodium perborate is. When you write

Fig. 31.—Appearance of patient (shown in Fig. 30) after loss of teeth. The child has his regained health. This case fittingly portrays the importance of early diagnosis of diseased gums and emphasizes the importance of observing the earliest changes in the tissue.

a prescription for sodium perborate you want to draw the druggist's attention to the fact that there is something else in the sodium preparations besides borax. They usually hand the patient a package of borax. Another thing about sodium perborate: It must be fresh. The druggist should order it in small quantities and dispense it in glass bottles, and the patient should keep the stock solution or stock powder well protected from moist and warm air. I prescribe a teaspoonful in half a glass of water and direct the patient to rinse the mouth every half hour and to make the solution fresh every morning, afternoon and evening, rubbing the powder in between the teeth and also, when it is bearable, continuing to brush the teeth with powder at least once a day.

Arthur D. Black, Chicago, Ill.: The large majority of the members of our profession have taken little interest in studies such as are presented by Dr. Mengel. We have not been in the habit, as we should be, of making the same critical examination of the gingivae that we make of the enamel. If we will look on the gingivae as the protective tissue of the periodontal membrane, in the same way that we look on the enamel as the protective tissue of the pulp, and make a critical examination of both the gingivae and the enamel with the idea of applying early treatment that will conserve periodontal membrane and pulps, we will soon come to appreciate the value of this service. In my own practice, I have for many years made a definite record of the various inflammations of the gingivae. Permit me to suggest a very practical plan by which one may convince himself of the importance of this service. We must appreciate the fact that any one of these lesions of the gingivae is, of itself, not a very serious matter, but that it is a necessary forerunner of periodontal disease. The pyorrhea pocket always has its beginning in a gingivitis. In the examination of the mouths of our patients, we should form the habit of making a record of each inflammation of the gingivae. Then, having applied what seems to be the proper treatment for the cure of each inflamed area, we should set aside the examination card so that when the patient returns within a few months for reexamination, we may reexamine these same areas, thus checking our

previous treatment. If we form the habit of making this record and of checking up on these cases as we reexamine, we will soon convince ourselves of the preventive value of the various forms of service that are necessary to eliminate the inflammations. Such a simple plan of following them up is almost necessary to convince us of the value of the service. We are too much inclined, because of the fact that these inflammations are slight, not to give them the serious consideration that they deserve. I regret that Dr. Mengel was not able, because of difficulties involved, to show the inflammations of the septal gingivae, which are of more importance than those that were shown.

It has been suggested that the name mouthbrush be used instead of toothbrush, because so many people think a toothbrush is only for brushing the teeth. If we could change the name, it would help us to educate patients to the importance of brushing the gums as well as the teeth. I often tell patients that it is much more important for them to brush the gums than to brush the teeth.

Dr. Mengel (closing): I wish to emphasize the trouble and the disappointments of trying to show things in the photograph that are seen in the mouth. I hope the profession will come to recognize the early symptoms of diseased gums and think of the condition as the beginning of a tragedy which they must make every effort to prevent.

ORTHODONTIA: CONDITIONS MAKING IT NECESSARY THAT MAY BE PARTIALLY ELIMINATED

By MARTIN DEWEY, D.D.S., M.D., New York City

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

ORTHODONTIA is that science which has for its object the correction of malocclusion of the teeth. Malocclusion of teeth is any deviation from the normal to such an extent as to interfere with function. The necessity for the correction of malocclusion is well recognized by the dental profession, and a great number of the public are beginning to realize the importance of orthodontic treatment. At the present time, however, we find patients are often brought to us for the treatment of malocclusions not so much with the idea of improving the function of the teeth as with the thought that correction of the malocclusion will insure a pleasing appearance. This is an unfortunate view on the part of the public when the importance of the dental apparatus is considered. It is an established fact that animal life would never have reached the present stage of evolution without the development of the teeth. We are inclined to think of certain vital organs as being extremely important and necessary to the life of the individual; and they are, under the present system of living. Nevertheless, when we consider the developments of the animal kingdom, we find that very early structures were developed for the purpose of assisting the animal in securing its food. Had these structures not developed the other vital organs would never have reached their present development because, without food, there would have been no evolutionary changes.

Orthodontia, which deals with correction of malocclusion, concedes that teeth which are in malocclusion cannot perform their proper function.

I think it is agreed by the dental profession and a large number of the lay public that teeth which occupy malpositions not only interfere with the normal functions of the teeth but, in certain individuals, also mar the facial lines.

It is to be regretted that the correction of a case of malocclusion extends over a long period of time, and consequently, from an economical standpoint, correction may be considered expensive, although the results greatly overshadow the outlay for the treatment. However, when considering the correction of malocclusion, it is important that we give some thought to those factors whose control may aid in the partial elimination of the necessity for orthodontic treatment. In order to approach this problem, we must first study those conditions that

cause or produce malocclusion. With no desire to enter into a discussion of the etiology, we must realize that it must be considered if we are going to recognize those factors which may be completely or partially controlled, in order to render orthodontic treatment unnecessary. Briefly, the etiologic factors may be divided into congenital and acquired conditions. Probably, the congenital factors play a greater part in the production of malocclusion than was realized a few years ago. Fortunately, a large number of these congenital conditions can be almost completely if not absolutely controlled. We refer to those conditions which arise in the embryo and which are the result of the environment under which the individual develops. The most important congenital factor, which we desire to consider at this time, is that of the mother's diet. If the mother is undernourished or does not eat the proper food, the embryo will be defective, and the defects will result in constitutional disturbances in the individual after birth, having their origin during the embryonic period and due to the improper condition of the mother. The diet of the mother during pregnancy, which has a marked influence on the occlusion of the child, could be absolutely controlled if the proper information were given her and she was inclined and able to follow the instructions. It is an easy thing to inform the mother that she should eat the proper food so that the infant can develop properly during the embryonic period, and thus prevent malocclusion at the time that the teeth erupt. However this is not so easily accomplished because of the environment in which the mother lives, she being surrounded in the majority of instances by conditions that tend to make it impracticable or at least inconvenient to secure the food necessary to insure proper development during the embryonic period. As a result of the malnutrition of the mother, the child not only develops malocclusion but also is susceptible to other physical ills, which produce a reaction that also tends to promote improper development of the teeth and supporting structures. In after years, it is hard to say which is the cause and which is the effect. You may say that this problem is one beyond the sphere of a dentist, and probably that is true. Nevertheless, the diet of the mother during pregnancy is one of the conditions that can be controlled in an endeavor to make orthodontia unnecessary.

Another controllable condition is the diet of the child during early life. The deciduous teeth are given to the child as organs of mastication and as such they must be used if the jaws are to develop. Disease, the result of improper food, causes many cases of malocclusion, and as disease is the result of improper diet, we have malnutrition creeping into the case, which tends to complicate matters and make necessary orthodontic treatment.

The matter of the responsibility for the development of malocclusion will be placed on the general practitioner to a greater extent in the future than it ever has been in the past. The teaching of oral hygiene, which is spreading over the country, slowly but surely, is going to result in a certain percentage of children seeking dental service at an earlier period than they previously did. It is during this early period that the general practitioner

can instruct his patients as to diet and thereby help to eliminate the necessity for orthodontic treatment in many cases.

A few years ago, I made a statement that one of the most frequent causes of malocclusion was the improper care of the deciduous teeth. After several more years of observation, I am inclined to believe that the deciduous teeth, as associated with acquired conditions, are probably responsible for as many cases of malocclusion as any other acquired factor. By acquired factors, I mean those conditions which arise after the birth of the individual, which are the result of the environment in which he lives, or rather are conditions which could have been controlled by the proper measures instigated at the right time. The deciduous teeth are formed for the purpose of masticating the food during the early life of the child and as a result of this mastication, they supply the stimulation that is responsible, to a great extent, for the development of the structures supporting the permanent teeth. Under the improper care of the deciduous teeth would first come the question of faulty fillings. I have seen many cases of malocclusion that have started in the improper filling of the deciduous teeth, owing to the fact that the operator had filled the tooth without any regard to the anatomic tooth form or any consideration of the shape of the deciduous tooth as it should function. An approximal filling for the deciduous molars should be constructed of a material that will retain the mesiodistal diameter of the tooth; which also means that the restoration must be made to reproduce the anatomic form of the original tooth. This brings into consideration the question of materials, which I do not care to enter into at this time. From my observation, the practice of filling proximal cavities of deciduous teeth with cement, which eventually washes out to a great degree, is responsible for a large number of cases of malocclusion, the eruption of the permanent molars allowing the deciduous teeth to drift together and thus producing a shortening of the lateral half of the arch owing to the loss of the mesiodistal diameter of the deciduous tooth. Not only does lack of proper contour of the fillings of the deciduous teeth produce abnormal molar relations: the lack of the proper restorations of the cusps is often responsible for the teeth drifting, as the lack of cusp relation very often is associated with the loss of approximal contact. Of the six forces of occlusion that we have been able to analyze up to the present time, the force of the proximal contact and the force of the inclined plane are as important as any, and the loss of these two factors in the deciduous teeth will always be responsible for some type of malocclusion. If the proper amount of attention is paid to the above mentioned conditions, many orthodontic treatments can be avoided.

We find an unfortunate condition when the deciduous teeth have been allowed to decay to a point where extraction becomes necessary. The extraction of a certain deciduous tooth will produce a type of malocclusion that can always be foretold years in advance of the ultimate result. The extraction of a mandibular cuspid or molar at a certain age will enable the orthodontist to portray exactly the type of malocclusion that is going to be present at the age of 14 or 15 years;

if nothing is done to prevent the occurrence of the malocclusion. The extraction of any particular deciduous tooth will produce a typical form of malocclusion, these having occurred so often that any orthodontist of experience, when told what deciduous tooth has been extracted, can foretell the type of malocclusion that will develop, provided something else does not occur to make the condition still worse. If it becomes absolutely necessary, because of pathologic involvement, to extract deciduous teeth, some means should be employed to maintain the space for the permanent teeth, and some device should be used to keep the remaining teeth in their proper position, in order to maintain a normal approximal contact and a normal cusp relation. The proper devices to maintain the space have been described many times, and I will not burden you by technical details.

Another factor which is producing malocclusion every day, and which is probably one of the biggest problems in dentistry today, is the extraction of the first permanent molar. Unfortunately, the first permanent molar decays early in life in the mouths of many individuals, and the 100 per cent vitality theory enables many men to ease the conscience, when extracting these molars at the age of 8 or 9 years because of the pulp involvement. Not only do we find these extractions at that age, but we even find some of the teeth sacrificed at the age of 14 or 15 because the dentist considers the tooth cannot be made healthy. I have no desire to enter into the discussion of root-canal technic but the fact remains that the "100 per cent vitality" men are making orthodontic treatment necessary to a greater extent than many realize. It is no uncommon thing to have patients referred to our clinic by the general practitioner immediately after he has extracted the first permanent molar. While undoubtedly the child required orthodontic treatment before the extraction of the first permanent molar, there is no question that he needs it twice as much as he did before; and the treatment has probably been made 100 per cent more difficult by the loss of that tooth. Admitting that certain of these pulpless teeth must be extracted, we must then approach our problem at an earlier date. We must start a campaign for the preservation of the first permanent molars, and if they can be preserved, the necessity for extensive orthodontic treatment later in life will be eliminated. Time and time again, we have seen cases of malocclusion at the age of 14 or 15 that have been instituted entirely by the extraction of one or more of the first permanent molars. The preservation of the first molars, by preventing the decay of the tooth, will eliminate much of orthodontic treatment.

Many cases of malocclusion have been made progressively worse by an improper filling being placed in the first permanent molar. Some fillings are just a mass of material employed without regard for the anatomic tooth form or the proper restoration of the cusps and proximal contact. These improper restorations of the first permanent molars have a similar detrimental effect on the dental arch as is seen in the improper restoration of the deciduous molar.

Under the head of congenital conditions, we spoke about the importance of the diet of the mother. Under certain acquired conditions, we

must also call attention to the fact that many cases of malocclusion in children are made worse, if not primarily produced, by improper diet and unwise habits. The improper diet of a child plays at least two rôles in the production of malocclusion. If the child does not have the proper food, he will necessarily be undernourished, and as a result of this malnutrition, there will not be proper growth of the osseous system of the child to accommodate the permanent teeth, at the time they erupt. This improper growth as a result of malnutrition from improper food causes another condition, a result of disuse. In order for the dental apparatus to develop to a sufficient degree to accommodate the permanent teeth, the deciduous teeth must function during their allotted time. If the child does not have the proper food to masticate, there will not be proper function, and as a result malocclusion will develop. I am inclined to believe that a great many cases of malocclusion considered due to improper development of the dental arches are the result of disuse. If we could get children to eat the proper kind of food and to chew it a sufficiently long time to give the teeth and jaws the proper function, a large percentage of malocclusion would be eliminated.

These factors, however, are within our control only in the same degree as is the diet of the mother. We cannot always change the mode of living. The human family lives in an environment today that is producing malocclusion because of the improper food supplied, the condition being the result of civilization, and one that it is almost impossible to control. A large number of cases of malocclusion are produced by the improper habits of mastication. I have seen many cases of malocclusion arising from the presence of a decayed deciduous tooth on one side of a mouth which caused the child to masticate entirely on the opposite side; with the result that the teeth on one side of the mouth were properly developed, while on the other side, there was a lack of development, owing to disuse. In case the deciduous teeth have abnormal approximal contact and an improperly inclined plane, they become factors in producing masticating habits that result in malocclusion following the disuse of the parts. The majority of these acquired causes that I have cited to you are conditions which are absolutely under the control of the operative dentist. One other factor which is also controlled by the general practitioner and which is responsible for many cases demanding orthodontic treatment is the advice given by a great many general practitioners that orthodontic treatment should be delayed until the child is older. "Delayed orthodontic treatment" is one factor which greatly lengthens the time necessary for the correction of malocclusion when the case is treated. If the majority of cases of malocclusion could be seen at the proper time, the length of time of treatment could be diminished at least 50 per cent. This would mean that the orthodontist could take care of twice as many patients, and it would cost the public only 50 per cent as much to have the malocclusion corrected. Delayed orthodontic treatment as a factor in the aggravation of malocclusion is to be regretted; but the fact that, in a great many instances, the treatment is delayed be-

cause of improper advice from the general practitioner is doubly regrettable.

DISCUSSION

Hugh G. Tanzey, Kansas City, Mo.: The discussion of this paper, I think, would be more nearly ideal if it were carried on by the general practitioner instead of the orthodontist. There is little in the paper with which I can disagree. Dr. Dewey has placed the causes of or factors in malocclusion in two groups, namely, the congenital and of the acquired. In speaking of the congenital causes for years the orthodontist has been calling attention to the possibility of preventing malocclusion by diet. I am not positive as to what can be done in the way of advising diet for the mother during pregnancy, but without question diet will affect the development of the bones of the child, and with the proper study and experimentation, could be so planned that the development of the teeth could be almost, if not entirely, controlled. At present, our ideas of diet are about as diversified as the number of tooth pastes that are on the market recommended for different ailments. We should be cautious about advising diet unless we are familiar with the results that we will get. Nearly twenty years ago, one of our prominent orthodontists advanced the idea that the most prolific cause of malocclusion was the *premature loss* of teeth or parts of teeth. That doesn't mean by extraction altogether, because we know that many other teeth are lost or doomed early in life. I prefer to use this term—it is a contributing cause, because so early in life we do recognize impending malocclusion. It isn't an uncommon thing for malocclusion to develop early, before there is any decay of the teeth. We see malformed arches, malrelated arches and teeth in malposition quite early in life. Dr. Baker estimates that 40 per cent of the cases of deciduous teeth that he had observed had malocclusion. That is a large percentage, and I don't think that any great percentage of that could be due to extractions or imperfect fillings or lack of fillings. However, one of the most aggravating or contributing causes of malocclusion that we have to contend with is the premature loss of either temporary teeth or the first permanent molars, or any other permanent teeth. I have in mind one case, in a child, 7 years of age, who had lost a first permanent mandibular molar. It required seven years to correct this condition, and there never was a time during that period when I could have conscientiously quit and said that it would be all right. There is no question that condition could have been corrected in much less time, had the first permanent molar not been extracted.

Now it is not the intention of Dr. Dewey or the other orthodontists to lay all of this to the general practitioner. I think if we could get the general practitioner and the orthodontist to consult a little bit more; if we could bring in the family medical adviser, the ear, nose and throat man and we could all consult about these things, it would bring about happy results.

It isn't an uncommon thing for medical men to advise the removal of treatment appliances without consulting anybody. That is an unhappy condition; it is embarrassing to the orthodontist, and it is questionable whether it ever gets the best of results. I think it occurs because of a lack of understanding. If we would refer our cases more to the general practitioner and to the medical adviser and consult them more often, much of the embarrassment that we experience would be obviated.

If the signs of malocclusion develop early in life, with the temporary teeth, wouldn't it be a good thing at least to accord the orthodontist the privilege of a consultation or of deciding whether treatment is advisable at that time? We do know that in many instances a few months of treatment with the quite young patient, of 3 to 6 years of age, will eliminate the need of prolonged treatment later in life. So many times the general practitioner evidently does not recognize these cases of malocclusion or the tendency toward this condition, and he likes to believe that it is going to be all right, and so he either advises waiting to consult the orthodontist or just letting it go, with the idea that it will correct itself or that it will come out all right. Another thing, the general practitioner feels that, many times, he loses the case when he refers it to an orthodontist. Many times, he feels that the treatment of malocclusion is expensive, and he decides for himself that the patient can't afford it. We should give the parents the privilege of deciding that point and of consulting the orthodontist, the general practitioner, the ear, nose and throat man, the medical adviser, and anyone else they deem proper, in order to

obtain the best results. We also know that many of these patients who are apparently unable to bear the expense of orthodontic treatment can get treatment free of charge.

Frank M. Casto, Cleveland, Ohio: The subject that Dr. Dewey chose to present here today is timely and of great importance. There can be no possible argument or division of opinion as regards the efforts to prevent oral deformities and disease. The highest aim and greatest achievement within the whole province of the professions of dentistry and medicine alike is "prevention," and every member of the profession has ringing in his ears constantly and forever that old adage, "An ounce of prevention is better than a pound of cure." Dentistry has undergone somewhat the same evolutionary changes as has medicine itself. The practice of medicine was first established because of the existence of disease. For many years, in fact centuries, its practice was almost entirely confined within the narrow scope of treatment and the cure of disease. As medical knowledge was acquired and classified, its practice and usefulness became broader and more comprehensive, so the great and uncompromising slogan "Prevention" was adopted and became the byword and watchword of the entire profession, and today the greatest scientific research in medicine is directed toward the accomplishment of means for the prevention of disease, rather than for its cure. We only have to reflect for a moment to be convinced on this point, for have not many of the communicable diseases and nervous disorders been wholly or in large part eradicated, and has not the practice of medicine resolved itself largely into the treatment for "prevention?" Is it not true that all of the knowledge and agencies used in the practice of medicine are directed toward "prevention?"

If these things were not so do you suppose that the average life of man could have been extended twenty years or more in the last few decades? As I said before, dentistry has enjoyed similar evolutionary changes, and it is today really in a transitional stage. For the first two hundred years or more, the practice of dentistry was confined almost entirely to the rebuilding, reconstruction, and replacement of diseased or lost organs. Conditions had to be met and dealt with in the best and most efficient manner, and in accordance with the best knowledge of the day. The real study of the prevention of oral deformities and disease has extended over only a comparatively few years. The study was begun by a few stout hearted, wise, industrious, persistent and persevering men, men, who, though they suffered many self sacrifices, blazed the trail, and whose work and achievements illumined the path, and built a structure upon which greater and better deeds could be and will be accomplished by the profession in the future. In dentistry, as in medicine, some of the best and most resourceful minds in the profession are now engaged in the study of the prevention of dental affections, and one would not have to draw much upon his imagination to realize that to achieve the necessary results all of the intellectual resources in the profession will have to be bridled, knowledge classified, scientific research continued, elaborated and intensified, and the full cooperation of the members of the profession be elicited. "Prevention" is an intensely interesting subject to discuss and to think about, although many phases of it are complex, confusing, uncertain, indefinite and unsolvable. The question of prenatal influences is mystifying, difficult of solution and practically impossible of control. The reasons are obvious. Heredity, environment, admixture of races, promiscuous marriages, diet, vicious habits, disease, social and economic conditions, and last but not least, function are to be taken into account. The progeny may have to confront and endure any one or all of these things, any one of which is capable of producing an abnormality. We can reckon that if some of these factors are eliminated, or subordinated, the child will have a far better chance for normal development, and we can reasonably assume that the influence exerted on the individual will be in proportion to the pressure or severity of the disturbing factor. If it were not a fact that Nature attempts, through propagation, to eliminate or correct abnormalities and to produce a pure species, and endeavors to conform to the law of the survival of the fittest, we would be a woe-begone race of people. To assemble any data of scientific value in regard to prenatal influences, careful observation and control will be necessary over a long period. One factor after another will have to be eliminated, and finally the influence of each factor determined. Under the present conditions, to the thoughtful person this would seem almost impossible, and so the control of prenatal influences for the

"prevention" of orthodontic abnormalities is a complex, confusing, uncertain and most difficult proposition, although it has been said by some wise philosophers that nothing is impossible on the face of the earth. When we consider our present qualifications, the conditions under which we are compelled to work, we should be conscious of our limitations, and devote our time, energy, and efforts to a large extent in more fertile fields. Of course, we do know that certain types of orthodontic malformation or abnormalities are apparently produced during pregnancy. It is possible that some of these might be prevented provided the mother could be kept under absolute control, being associated with environment, diet, social conditions, disease and nutritional disturbance. We must not and do not consider this question from the orthodontic standpoint alone or from a peculiar orthodontic malformation that may occur. This may only be incidental or accidental, and may be the result of a malnourishment and poor development. We can, with good reason, believe that if a child is infected *in utero* with syphilis or tuberculosis, or has some severe nutritional disturbance, and at birth is far below normal physically, orthodontic malformations will be manifested along with other malformations and abnormalities. Dr. Dewey emphasized the necessity for proper diet for the mother during pregnancy. I am quite in accord with his point of view as regards the effect nutrition has on the developing embryo. It seems obvious that the mother should have a sufficient supply of food of the proper kind or the growing child will suffer from malnutrition, with the consequent damaging results. Nutritional disturbance in the child is not always the result of improper diet of the mother. Perhaps it is quite as often the result of disturbed or perverted function of the centers that have control over the distribution of nutrition. Without the least desire to minimize the importance of the dentist's qualifying himself to prescribe for the pregnant mothers, and without any attempt to circumscribe his field of practice or usefulness, I opine that, for the present at least, this work lies properly within the scope of the practicing physicians. I shall, therefore, direct my remarks to the predisposing or acquired cause of malocclusion after birth. If we will give careful consideration to the conditions that produce malocclusion and be conscious of them when they are present, and of their importance, then, and only then, will we be able to practice "preventive orthodontia," and if we do not, we are most derelict in our duties and responsibilities. Vicious habits, such as thumb, finger, lip, and tongue sucking should be broken at an early age, abnormal or diseased tonsils and adenoids should be removed, mouth breathing corrected and normal breathing established. Proper diet should be suggested, and when necessary, insisted on; normal function of the mouth and teeth promoted and encouraged, and proper mouth hygiene practiced. The practice of scientific and effective mouth hygiene should be begun at an early age, and continued indefinitely. The deciduous teeth and the child mouth, as Dr. Dewey has stated, should be kept in a healthy condition. Any imperfection should receive prophylactic care, and certainly if any of the deciduous teeth are lost prematurely, the spaces should be retained. While not invariably true, it is a pretty well recognized fact that the normal development of the permanent teeth is dependent on the development of deciduous set. It is quite certain that a normal permanent set of teeth could not succeed a deciduous set that was malformed and malocclueded. A complete examination of every child coming under our observation and care should be made. All things pertaining to the teeth and their development should be carefully observed and recorded. Every available diagnostic method should be employed. Having treated the case in this manner, and having assembled and considered the data carefully, if in your judgment, orthodontic interference is indicated, in order that a more aggravated case of malocclusion may be prevented, it is your duty to see that such interference is undertaken without delay.

SOME REASONS FOR THE FAILURE OF THE RETENTION OF DENTURES

By E. W. BROWNING, D.D.S., Salt Lake City, Utah

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FROM the beginning of dentistry up to and including the present day, it has been interesting to note that some patients could wear dentures with apparent comfort no matter how unscientifically the dentures were constructed, while for other patients the most skilful operator could not make a denture that would fit. If he was fortunate enough to procure a fit, the beautifully constructed denture became loose after a few months, the loss of confidence on the part of the patient resulting in his seeking aid elsewhere. This condition induced the thinking men of the profession to study diligently in an effort to determine the causes of these conditions and effect a cure. Their investigations taught us to study more carefully the anatomy, the natural teeth, the occlusion, the condyle path, the curve of Spee, etc., and incidently resulted in a few more hundred different types of articulators being placed on the market. Suffering humanity was benefited a great deal by these investigations, but still we had patients whose mouths failed to retain dentures. Then, preparations made from gum tragacanth came on the market finding a rallying support from the general practitioner who was too lazy to hunt out the cause for his failure. Undoubtedly, gum tragacanth has a place in full denture prosthesis, but its use has been wofully abused, and we have been led to treat the effect rather than the cause.

About this time, the students of our profession began talking occlusion. The correction of traumatic occlusion prevented many flabby ridges and thereby did a great amount of good, but we continued to have a shrinkage of the ridges, and dentures continued to become loosened after a few months' usage.

Then it was that the oral surgeon came to the rescue of the prosthodontist. To Dr. Shearer and Dr. Novitisky goes the credit for first surgically preparing a mouth for dentures. Our hats off to these two men who stood the abuse of their fellow practitioners and yet retained courage enough to fight for what they knew was right. For fight they did, with the result that the alveolotomy, alveolectomy, buccal plate operation, or whatever you wish to call it, has stood the test and is here to stay.

If the theory of focal infection is true, and all broadminded men are convinced that it is, then to the alveolotomy goes the credit for removing tons of infection. We will not dispute the fact that some mouths have been ruined by

this operation, because some overzealous men with a sharp rongeur have removed more process than was necessary. But never has there been so complete an alveolotomy performed by man as Nature has performed and is performing for some of our patients.

Yet, with our beautifully prepared mouths from which all infection has been removed and with all sharp points reduced to a common level, we continue to see patients who, every few months, require either a new denture or a relining of the old one. These cases will continue to exist, these patients will continue to suffer and continue to blame the dentist until the time arrives when we shall know more about cell life, more about the osseous framework, more about calcium and more about the diet that is required to make bone tissue.

There was a time when we as oral surgeons and exodontists did not come in for our rightful share of condemnation by the patient for his or her inability to retain the denture. But now, in our profession, so wonderfully built on alibis, it is possible for the general practitioner and even the prosthodontist to shift the responsibility and condemnation on us. In the patient's already diseased state of mind, the remark that "the oral surgeon did not properly prepare your mouth" finds a ready lodging. How logical this remark sounds to the patient can readily be understood when we realize that among the patient's acquaintances there are probably a dozen people who are wearing dentures with comfort.

Our alibi lies in the roentgenogram, which tells us the condition of the osseous tissue. Rather than use it as an alibi, we would better find the cause and thereby do mankind the greatest good within our power.

Among all the reasons for the failure of the retention of dentures, the most important is the condition of the alveolar process. If we are going to continue to neglect to make roentgenograms of our patients' mouths, before the removal of the teeth; if we continue to take incomplete roentgenograms, and if we continue to neglect to study these roentgenograms properly after they are taken, we shall continue to be at least morally responsible for the condition of these unfortunate people who are unable even to laugh for fear their dentures will drop.

Osseous tissue is made up of carbon, hydrogen, oxygen, nitrogen and the inorganic salts, namely: calcium, iron, magnesium, sodium and potassium. Of these calcium predominates, and yet we know less of calcium than of any of the others. Even such an eminent biochemist as Mathews in his textbook on physiologic chemistry dismisses the subject of calcium metabolism with the remark that so little is known of it, he will not give the matter further consideration. We know that a mother's milk is obtained from her blood, but we do not know why a mother's milk contains ten times as much calcium as the blood. We know that ocean water contains a very minute portion of calcium, and yet this very small part of calcium is the all important thing that keeps the deep sea animals alive; for with the removal of the calcium from the water, these animals blow up and burst. We know by experimentation that the outer lining of a cell is composed of calcium because when there is placed near the cell something that will dissolve the calcium, the cell disappears.

Normal alveolar process is recognized radiographically by the irregularity of the cancellated structure being definite and clear cut and by the harmonious blending of the light and dark tones that make up the density. On account of spongy bone being less dense than compact bone, the cancellations are shown as being more irregular, and as the maxilla and mandible are made up chiefly of spongy bone, it becomes an easy matter to recognize the normal. The harmony of shading of the light and dark tones depends upon the calcium salt distribution in the bone tissue, normally being distributed in a well balanced uniformity. The calcium salt in bone does not permit the passage of the rays; therefore, a radiographic reproduction of the alveolar process becomes a reproduction of the calcium salt content. When there is a diminution of the calcium salts, the rays pass through more easily and affect the emulsion more deeply, producing a darker, or more correctly, a radiolucency. When there is an increase of calcium salts, there occurs a resistance to the passing of the rays which affects the silver in the emulsion with less intensity and thereby produces a lighter spot called radiopacity. There is no pathological change in bone tissue especially of the spongy type that does not affect the structure in some way. In normal process the distribution of calcium salt is well balanced, therefore there are no localized spots of white or black indicative of a decrease or an increase of calcium salts, because such a condition occurs only from pathological influences. (Pollia.)

Whenever an irritant affects living tissue, that tissue shows a defensive and protective reaction known as inflammation. Inflammation and infection are not synonymous because inflammation is the result of one or more of five factors, namely: mechanical, chemical, thermal, electrical and bacterial. As it is possible to produce inflammation by other means than bacteria, all inflammation is not necessarily infective. Unhealthy tissue is always pathologic, but pathologic tissue is not always unhealthy. Pathologic tissue is abnormal tissue, the result of the normal attempting to adapt itself to an abnormal condition. When this abnormality affects the well being of the individual, the tissue becomes unhealthy. Roentgenographically, we can recognize pathologic tissue, but we cannot tell whether or not it is harming the patient. This must be determined by the clinical findings and by symptom expression. It would not be unreasonable to presume that, if we have excessive shrinkage of the ridges and the patient's illness dates to a period prior to the dental symptoms, some metabolic disturbance of long standing must be considered.

We cannot deny that the roentgenogram reveals the above mentioned points in anatomy. Then, provided the roentgenographic technic has been correct and exact, we are in a position to render our patients the greatest service possible. Certain forms of pyorrhea have long been recognized as being associated with chronic interstitial nephritis, and the dentist, by recognizing this, has been able to send his patient to his physician probably years before he would otherwise have gone. The dentist has thereby been the means of assisting the physician in either curing or checking a disease that would have proved fatal.

We are becoming pretty well acquainted with the fact that intoxications of long standing are favorably influenced by the administration of calcium in some form that renders it susceptible of being metabolized. Again, there are the calcium deficiency diseases *per se*, tuberculosis probably coming in this category. In the face of the foregoing facts, it would be logical to assume that, in tuberculosis, with a disproportioned calcium metabolism, there could be a concomitant metabolic calcium disturbance at work in this process of resorption which is going on or has

gone on prior to the time the patient comes under our observation.

Calcium is the most important, and incidently the most neglected, of all the elements that go to make up our bodies. The reason for the neglect is explained on the basis of the insolubility and lack of absorption of a great many of the salts. Let me remind you that in all newly developed inflammations, sodium and potassium are increased and calcium decreased. As healing goes on, there is a return of the normal ratio of these inorganic elements. Dr. Salveson shows by his animal experimentation that calcium deficiency goes hand in hand with the disturbance of the parathyroid glands; thus these glands may become toxic and thereby increase calcium metabolism. Therefore, it is only rational to presume that when we find a calcium deficiency in the alveolar process, we are dealing with a multiple condition and should refer the patient to some good diagnostician for a thorough physical examination with special reference to tuberculosis. Then, as the periodontist can detect chronic interstitial nephritis, so can the general practitioner, with properly made roentgenograms, detect tuberculosis together with many other diseases, because the film shows us beyond question whether we have an abundance or a lack of calcium. Therefore, excessive shrinkage of ridges under dentures instead of being due to faulty technic in the construction of the restoration or to faulty technic of the surgeon may be due to some systemic involvement.

CONCLUSION

Allow me to make a few suggestions. Although a patient has a calcium deficiency as manifested by the roentgenogram, do not use this fact as an alibi. Instead, let us instruct the patient in proper diet, advising the use of a large quantity of milk and the coarser vegetables, which contain an abundance of calcium, or better still refer him to his physician for intravenous administration of calcium. One of the saddest moments in anyone's life is the time when he is called on to part with the natural teeth. Every mouth should be examined by roentgen ray before the removal of the teeth is advised. In all cases, a complete set of denture roentgenograms should be insisted on. More exposures should be made, roentgenograms should be taken with a standardized technic, and should be studied more carefully. The dentist should cooperate with the patient's physician, and in return will obtain his cooperation. The dentist can assist the physician in determining the difference between good roentgenography and poor roentgenography and between good dentistry and poor dentistry. The dentist must think more of the patient's health than of his money, keeping in mind that the patient's health is paramount, and when we think health, wealth will follow.

DISCUSSION

F. F. Molt, Chicago, Ill.: The subject of making more complete roentgenograms than the average is close to my heart. It seems to me that we as dentists are the ones to preach this gospel. Somehow or another there must be worked out some basis on which oral roentgenography can be stabilized. We have three factors at present—probably always will have—in the matter of oral roentgenography. There is the lay roentgenographer, to begin with, who presumably has nothing more than a technical knowledge of the making of roentgenograms; there is the physician, who has the medical aspect of roentgenography in general but who knows nothing about dental subjects, and there is the dental roentgenographer, who has the dental aspect but, on

the other hand, frequently apparently knows or cares little of the medical questions involved. Dr. Browning has given us valuable points here on the medical aspect of oral roentgenography. As to just how much the alveolar structures of the mouth may be an index of systemic calcium metabolism, we have unfortunately little information. It is from just such papers as this that we are going to get to know more of this subject. The aspect of *complete* roentgenography it would seem would require little discussion. I don't know how we establish our average on general dental roentgenography, but the system seems to be to take comparatively few films, and if the roentgenogram as produced is not complete, to guess at the rest of it. Dr. Simpson, who is with the possible exception of Dr. Raper, the foremost radiodontist in this country, has contended that radiodontia is a specialty in itself. I can't get his point of view entirely because I think that this work fits in so logically with that which we are doing that it may be considered really a part of our work. Surely no one is in a better position to make an interpretation of roentgenographic appearances than the man who later goes into the bony structures to rectify conditions disclosed, as we do. The radiodontist has not often that opportunity or even the opportunity of observing the surgery. Even observation will not take the place of feeling the texture of the bone as we do in our digital manipulations. Therefore, I feel that Dr. Browning's points cannot be too greatly stressed; that this is a subject that may readily be amplified by further research on such points as he has brought forth. I also feel that our society is in a position now to suggest and even to father research work on such subjects.

J. A. Blue, Birmingham, Ala.: Dr. Browning has shown us some excellent dental roentgenograms. The tone is beautiful, and he has proved that the use of the same machine, setting, time and distance, in all cases will give a contrast that will enable us to judge to some extent at least the mineral content of bone. If bone has an abundance of mineral salts, the result will be a roentgenogram light in tone, and a deficiency of mineral salts will give a roentgenogram dark in tone, because of the lack of dense bone to stop the rays. I will call your attention to the two edentulous cases shown. Dr. Browning used the same exposure technic; that is, the time, milliamperes and backup were the same in both cases, and one was very much darker than the other. That is what you will see if you are using the same technic in all cases—one comes out a great deal darker than the other and the texture is uniform throughout. In the first case, there was shown a decided deficiency of calcium. The next case had a great deal more calcium, and the result was a much lighter picture. Diet is a very important question now facing the exodontist and oral surgeon. We should first study, through the medium of the roentgenogram, the type of bone we are dealing with, as to whether it is dense or rarefied. The feeding of edentulous patients is important, as not only must the bone that we have left after the removal of teeth be conserved but also new bone must be developed to fill the low places and sockets. Therefore, a diet that contains bone-building material is essential, but, at the same time, we must realize that the patients are unable to chew. I suggest fruit juices, milk, eggs, milk toast made with whole-wheat bread, and vegetables, especially the leafy ones, well cooked, and by all means the patient should be instructed to use the liquids in which the vegetables have been cooked—in other words plain, old "pot liquor." Whole corn bread or whole-wheat bread can be soaked in these vegetable juices, and they are in this way made very palatable. There are now on the market various raw vegetable juices that are put up in a form which can be easily used.

M. R. Howard, Denver, Colo.: Observations carried out in Colorado in the last five or six years have demonstrated that if discolored process, infected areas or rough edges are left after operation, absorption is encouraged. This is evidenced in the making of a plate and subsequently having to rebase. Also, it has been demonstrated by practitioners with whom I am associated that in those cases in which the infected areas, discolored and rough edges of process have been removed after reflecting the tissue, there is a minimum of absorption and little necessity of rebasing.

Theodor Blum, New York City: Granted that the technic of development and the distance of the tube from the point we wish

to examine by roentgen ray is the same in all cases, perhaps both Dr. Browning and Dr. Blue forgot another important factor, which is this: How wide is the alveolus? In some cases, we get a very narrow alveolus, which, of course, would be comparatively easily penetrated; while, in others, we get a very wide one, which would not be so easily penetrated. I think this is another point which we have to take into consideration in interpreting these roentgenograms.

Edward L. Moravec, Cedar Rapids, Iowa: There is just one question I should like to ask in conjunction with what Dr. Blue has said. Considering the varying density in bone structure, from youth to old age, also the thickness of bone and soft tissue of different individuals, would you not vary your technic accordingly?

W. B. Amy, Toronto, Canada: Might it not be feasible to check up on this very interesting phase of roentgenography, the first of which I heard, I think, from Dr. Howard Jackson, in Detroit? He believes that he can almost detect different types of diseases. Why, in the tuberculous cases, could this not be checked up in a sanitarium where they have the patients under intensive treatment and have many of them that are sent out as cured? Why could not these people be examined roentgenographically on their entrance to the sanitarium and then at different intervals so that we could determine whether the calcium content differs later on?

H. A. Elmquist, Des Moines, Iowa: I also should like to ask if the alveolar process is the only bone in the body that discloses the calcium difference or if this couldn't be checked up in the rest of the body? Couldn't the physician check up, rather than we enter internal medicine?

Dr. Howard: We have here a man who has charge of the Modern Woodmen of America Sanitarium at Woodmen, Colo. He just now whispered to me that he would like to talk about an hour on that. I think he knows a lot about it. I would like to hear from him—Dr. Kramer.

C. S. Kramer, Woodmen, Colo.: I haven't charge of the Woodmen Sanitarium; I have charge of the dental department. There is one thing in regard to tuberculous patients that you can sometimes see and that is the increased density in bones in both upper and lower jaws, a hypertrophic condition. You see it in the fingers, in the thickening of the long bones. It is not true of all cases. Probably about 65 per cent of our advanced cases have these thickened processes and nodules in the palate, nodules on the inside of the lower jaw about the anterior quarter of the mylohyoid ridge, and those, of course, will give a lighter roentgen-ray film. We don't get the so-called rarefied areas so distinctly in those cases, but the thickening, of course, gives a lighter picture. Sometimes, it will distort upper molars until it is very difficult to get accurate pictures, especially of upper molar roots.

Dr. Browning (closing): There are several points that, no doubt, were not made clear, but that was due mostly to lack of time. A whole lecture could be devoted to any part of the subject and still leave much to be said. I appreciate Dr. Molt's and Dr. Blue's bringing out the fact that the light was not very good. I will leave the pictures here, although I never advocate sunlight examination of roentgenograms; any of you who are interested can certainly get a much clearer conception of the difference in the texture, etc., by taking them to the window.

Dr. Blue mentions feeding the patient after the operation. That is a very good point, and I am glad he brought it out. My contention is, that the time for the dieting to begin is not after but before the operation.

Dr. Howard asks about the edentulous socket from which the tooth had been extracted for some time, about the *modus operandi* that was used there. I take for granted that the tooth was simply extracted. All I know is that the soft tissue was beautifully healed. The roentgenogram shows the soft tissue, so you can get an idea of the amount of healing that had taken place. The patient reported that the tooth had been extracted for two years. He asks also about the other patient. The woman at the county hospital was a charity case. I do not mean that charity cases should not receive the best attention. I find, in many cases, they receive as good or better treatment than the paying patients. I did not extract the teeth, but I know they were ex-

tracted, two months prior to the taking of the roentgenograms. I think Dr. Howard brought out a very good point, in that these conditions do follow the method of simply tearing out the teeth. Dr. Blum brings out the question of the thickness of the alveolus, which brings us back to the point that these roentgenograms do not show on the screen as they would show before a view box and under a magnifying glass. That is why I stress examining and studying our roentgenograms more carefully. My contention would be that, if you will carefully examine the roentgenogram, it is not a matter of the thickness of the alveolus but the texture of the alveolus. I am not saying that you would not find, in cases with some systemic involvement, areas that are light; but, as a rule, in fact in practically all of them, you will have that lack of density, and regardless of whether they are light or dark, the texture of the alveolus remains the same. Dr. Moravec brings out the point in technic that I could not hope to touch on, but I can answer that I do use exactly the same technic on all patients, young or old, small or large, regardless of age or weight. The technic is exactly the same all the way through. The only variation is a constant variation, which is a variation in the time of exposure in different parts of the mouth, but that variation is constant, so the technic for each picture, distance, spark gap milliamperes, exposure, and development are exactly the same. He brought up the point as to whether the thickness of the tissue makes any difference. Fortunately, I have some slides that will answer this question. In the first case, you will note that there is a calcium deficiency, not only as shown in the roentgenogram of the osseous tissue surrounding the central incisor, but also in the long bones. While in the second case, you will note an abundance of calcium, not only in the osseous tissue surrounding the central incisor, but in long bones as well. The patient in the first case weighs 160 pounds, with the calf of the leg measuring 16½ inches, while the patient in the second case weighs 115 pounds and the calf of the leg measures 12½ inches. The technic in making films of the two cases was exactly the same; therefore, I maintain that it is not the amount of tissue to be penetrated that makes the difference in the appearance in the roentgenogram, but the calcium salt content. I believe the difference in these two cases also answers Dr. Elmquist's question in regard to the long bones. Dr. Amy spoke about checking up in a sanitarium. We are now working in the only place I have access to where I know there are tuberculous patients. That is at the county hospital. In another year we will have checkups that will substantiate some of the claims.

ECTODERMAL ORIGIN OF MESENCHYME*

By NEWTON G. THOMAS, M.A., D.D.S., Chicago, Illinois

IF ANY scientific statement ever approached the tone and form of a dogma, the concept that "no mesenchyme ever develops from the ectoderm" deserves that distinction. That certain muscles are derived from this layer is quite generally believed, but, although this statement is made quite universally in textbooks, some teachers of eminence still question its validity and call attention to their doubt in the classrooms. This to show the tenacity of the exemption granted the ectoderm from contributing to connective tissue or muscle tissue!

In 1893, Miss Julia Platt[1] traced cells of ectodermal origin to permanent head structures other than ganglions, such as certain branchial cartilages. It had been noted previously that some cells of the neural crest did not enter into ganglion formation, although their actual fate was not determined. Marshall (1878), working on the chick, and van Wijhi (1882), using selachians, had made the notation. Kastchenko (1888), employing selachian material, and Goronowitsch (1892), using birds, had said more: that from these cells mesenchyme formed. In 1893, Goronowitsch again published findings asserting that mesenchyme developed from both neural crest and lateral ectoderm.

In 1894, Miss Platt extended her work and employed the terms mesectoderm and mesentoderm to indicate the different origins of the mesenchyme involved. In 1896 and 1897, she derived ganglions, nerves, mesenchyme, branchial cartilages and the dentin of teeth from the mesectoderm.

This work did not escape objection, nor did it lack support. Kupffer (1895), Lundborg (1899), Dohrn (1902) and Brauer (1904) agreed with Miss Platt's interpretations and findings; while Rabl (1894), Corning (1899), Minot (1901) and Buchs (1902) disagreed. In this connection, the near approach to dogmatism is seen, as some of the investigators voice their criticism and opposition.

The works of Stone[2] and Landacre[3] make an interesting addition to the literature on this subject, as well as give verification to the general premise, which is scarcely questionable save on the infallibility of the original dictum, which is scarcely scientific. Stone, using amblystoma punctatum, undertook to demonstrate what occurred subsequent to the removal of placoids and neural crest areas. He saw that nerves or nerve

*An abstract of papers by Platt, Stone and Landacre.

1. Platt, Julia B.: Ectodermic Origin of the Cartilages of the Head, Anat. Anz., Vol. 8, 1893.

2. Stone, L. S.: Experiments on the Development of the Cranial Ganglia and the Lateral Line Sense Organ in Amblystoma Punctatum, J. Exper. Zool., Vol. 35, 1922.

3. Landacre, F. L.: The fate of the Neural Crest in the Head of the Urodeles, J. Comp. Neurol., Vol. 33, 1921.

fibers failed to develop, but also that certain ectodermal cells arising from the neural crest descend on the visceral arches, around which they arrange themselves, where they form cartilaginous tissue. He states that the wandering mass of mesectoderm is of neural crest origin and is in no region augmented by cells of the lateral ectoderm. He further observed that removal of the neural crest in the branchial and hyoid regions is accompanied by a marked deficiency in the branchial and hyoid cartilages. Removal of the neural crest in the trigeminal region shows, not complete absence, but deficiencies in the size of the quadrate and mandibular cartilages. Stone has no doubt that these cartilages are formed from crest cells.

Landacre, employing urodeles, agrees in his observation with Stone, in the maintenance of the thesis that mesenchyme develops from ectodermal cells. He found, too, that Meckel's cartilage, the palato quadrate bar and all the branchial cartilages are ectodermal in origin; and he found that from the lateral ectoderm arose the dental ridges, the teeth and the dense connective tissue in which the teeth are imbedded.

The histologic differences between ectodermal and entodermal cells form the basis of observation. The ectodermal cells are small, contain fairly uniform yolk granules, which the cells lose early, and are usually pigmented, while the entodermal cells are larger and rarely pigmented. Also the continuity of sheets of ectoderm and entoderm cells is a valuable aid in following their distribution. These differences can be observed after definitive ganglions, muscle, cartilages and mesenchyme are formed.

These findings are of much interest in the consideration of dental embryology. They open a field of research that fascinates with its possibilities. The creatures used by the workers in these articles were below mammals for the reason always uppermost in laboratory procedures: ease of acquisition and manipulation. Much of the developmental history of higher forms is based upon the developmental processes of lower forms, a reasonable modus operandi although not an infallible one. Attention was drawn by Platt to the divergence of origins of similar structures in different phyla, which doubtless is a fact of development. Here, however, the interest is in the fact of mesenchymal formation from ectodermal cells with the consequent possibilities of further tissue changes from the mesenchyme. The findings indicate what may be expected in mammalian embryology, with the likelihood of many variations from the accepted sources of numerous structures.

(I have asked a number of eminent neurologists their judgment of the works of which this digest is made. It is of no slight importance that they give unquestioning credence to the papers quoted.)

IMPORTANT CONSIDERATIONS IN THE DIAGNOSIS OF SURGICAL ORAL LESIONS

By THEODOR BLUM, D.D.S., M.D., F.A.C.D., New York City

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

WITHOUT a correct diagnosis, the prognosis of a condition cannot be given and the treatment is usually unsuccessful. A proper diagnosis can be reached only if the subjective sensations (symptoms), objective manifestations (signs), family history and previous history, as well as present illness, are logically correlated. In the specialty of oral surgery, these facts are often not considered and their importance is frequently lost sight of. Every patient who comes under the care of the oral surgeon should be subjected to a thorough examination just as in a general medical or surgical case. The oral surgeons who have the medical as well as the dental degree and who have hospital appointments will consider as superfluous any mention of the foregoing. However, one must not forget that the majority of practitioners in this specialty are dental graduates only, as a rule unfamiliar with the hospital routine of examining patients. It is for this reason that I shall dwell a little more in detail on the question of taking histories.

The accompanying history charts of Bellevue and Allied Hospitals of the City of New York (Figs. 1 and 2) will give the reader the essential points; the first one giving under family history: hereditary diseases, family deaths; under previous history: habits, occupation, childhood diseases, other diseases or injuries, venereal history; under present illness: date, mode of onset, probable cause, injury, manner of occurrence, course to admission, etc.; and the second chart asking for a description of the local condition, general appearance, etc.

Of course, in minor ambulatory cases, a complete physical examination of chest and abdomen, etc., will not be necessary, but can be obtained generally from the family physician of the patient.

When a patient enters the room, one can usually obtain a general impression of the state of health from the appearance of the skin, the development of the body, the gait, speech, etc. However, the first and most important question comes under the heading, "Chief complaint," which should be taken down on the history charts in the patient's own words. While the history of a patient is practically completed with the foregoing, it is not entirely so without a number of tests, which are of vast importance in various diseases. The average case will necessitate a urinalysis, blood count, including differential count and coagulation time, Wassermann examination, and last, but not least, a complete roentgen-ray examination of the teeth, jaws and sinuses. The testing of the pulps of the teeth is often indicated.

However, finally to establish a definite diagnosis, it is well to consider other conditions which, in some way, simulate the case under observation and which it could be mistaken for. Only after these have all been excluded has the examiner done his duty. Therefore, the impor-

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BELLEVUE AND ALLIED HOSPITALS

History No.....

Name..... Address.....

Occupation.....Age.....M. S. W. D.....Nativity.....Ward.....

Admitted.....192....Discharged.....192....RESULT: Cured—Imp.—Unimp.—Died

Diagnosis.....Necropsy (Yes) (No).....

Complications.....

.....

Visiting Dr.....House Dr.....

FAMILY HISTORY Hereditary diseases Family deaths	PREVIOUS HISTORY Habits — occupation — childhood diseases—Other diseases or injuries—Venereal History	PRESENT ILLNESS Date—mode of onset—probable cause—Injury—manner of occurrence—Course to admission, etc.

Fig. 1.—History Chart.

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HOSPITAL

History No.....

PHYSICAL EXAMINATION

Name..... Admitted.....192..... Ward.....

Local condition General appearance Eyes Ears	Nose Mucous membranes Tongue Teeth	Throat Cardiovascular Lungs Abdomen	Liver Spleen Kidneys Sexual organs	Skin Glandular systems Bones — muscles — joints Nervous system

Fig. 2.—Examination Chart.

tance of a differential diagnosis can hardly be overestimated.

After a thorough examination of a patient, the diagnosis established is only a working diagnosis; in other words, future observation and treatment may convince the attending surgeon that a modification or entire change of diagnosis is necessary. Such a diagnosis is well termed "final diagnosis." During the treatment of a patient, other conditions are liable to arise, or complications to set in, so that additional diagnoses have to be made during the treatment of a case.

I shall endeavor to enumerate a few of the more important considerations in the diagnosis of surgical oral lesions by dealing with various diseases individually in different chapters.

A chapter of oral surgery rather unsettled as yet in certain quarters is that of malposed teeth. Any tooth that is not in normal position is called malposed, and only if in abnormal contact with another tooth is called impacted. Every malposed tooth should be either placed in its normal position or removed. Any further explanation must be looked for elsewhere.[1] Accepting the foregoing as correct, the diagnosis is comparatively simple. Careful roentgen-ray examination, even stereoroentgenograms or right angle pictures may be necessary to give a clear conception of the actual position. Frequently, the mandibular third molar on the way to its normal position is slightly leaning forward, but only apparently in impaction. The maxillary third molar, as a rule, points posteriorly during the same period. Both are neither malposed nor impacted, and must, therefore, not be disturbed. The more fortunate patient appears for examination at a time when the roots of the malposed teeth are not fully formed. It is at this stage that the determination as to whether or not they are malposed and whether or not they ever will come into normal position is of greatest importance, because the operation is then considerably simpler on account of the fact that the roots are not fully developed; the bone is less calcified, and, because performed in the young, the operation is attended with less disturbance.

A condition closely related to the subject of malposed teeth is that of partly erupted teeth. The infection that is liable to develop in the gum pockets covering malposed or partly erupted teeth may give rise to very serious complications. I have the erupting mandibular third molar in mind. An infection from the so-called "wisdom-tooth" pocket may cause a pericementitis, periostitis or lymphadenitis, or a combination of them all. Particular attention is called to the fact that pus may travel into the region of the anterior pillars of the fauces and cause a peritonsillar abscess or travel downward and form a pharyngeal abscess. When examining such a case, the origin of the condition will have to be looked into in order that the proper treatment may be outlined. A complete history of the case will point, in many cases, toward a partly erupted third molar with the overlying inflamed soft tissues as the etiologic factor.

Cysts of the jaws, which are usually classified as tumors, are treated here separately, as they occur so frequently. Still retaining the old nomenclature of radicular, follicular and multilocular cysts, one can dismiss the last two with few words. The multilocular variety, as the name implies, is easily diagnosed by means of the roentgen ray on account of the appearance of many well-defined cysts of various sizes, and frequently also because of its harboring a tooth. At times, it will be, in part, a solid tumor appearing under the microscope as an adamantinoma. Its most frequent location is the angle of the jaw. I have never seen it in the maxilla. The follicular cyst always contains in its cavity the crown of a tooth, around which the cyst develops. It occurs most frequently in the young, between the ages of 12 and 16 years. These growths are sometimes erroneously diagnosed as radicular cysts originating from temporary teeth, although the cyst sac has no etiologic connection with them, but involves them through its expansion and growth. Radicular cysts are at times multiple, and in order that they may not be overlooked, complete roentgen ray examination (intra-oral and extraoral) must be made, to avoid an incomplete diagnosis. The pulp tester plays an important rôle in determining the vitality of the teeth involved in the cystic area or adjoining it, but

1. Blum, Theodor: Malposed Teeth: Their Classification, Pathology and Treatment. Internat. J. Orthodontia, 9: (Feb.), 1923.

even before the patient is finally discharged, it should be used again to ascertain whether or not, at the time of the operation, the vitality of the adjoining teeth was destroyed.

In diagnosing the solid tumors of the jaws, the most important point to determine is whether they are benign or malignant. The growth will have to be removed en masse in either case; but the treatment of the malignant type is so different that great stress must be laid on their differentiation. The two more important varieties of sarcoma can be easily differentiated when we consider the fact that the one developing from the periosteum is stony hard; while the other, originating from the bone marrow, is soft—so soft, in fact, that it is often diagnosed as an abscess, and incised. Both varieties are practically hopeless as far as a cure is concerned. The cases microscopically diagnosed as osteosarcomas have been found clinically benign. The so-called giant-cell sarcoma is a characteristic reddish brown; is somewhat lobulated and is more frequently seen in the maxilla. It is not a sarcoma and is benign in character. Epithelial tumors of the mouth are easily recognized, but rarely in their early incipiency. All tissues of abnormal appearance in the mouth, therefore, should be looked on with suspicion and carefully studied. Bulging of the outer plate of the maxilla or of the palatal plate covered with normal mucosa, simulating fluctuation and showing irregular loss of bony structure on the roentgenogram, is almost certainly a primary carcinoma of the antrum. When these tumors are of considerable size and ulcerated, the characteristic *fetor ex ore* is present. Probing and repeated palpation of the mass is decidedly contraindicated as cancer cells may be separated by manipulation and be carried by the lymph channels into different parts of the body (Bloodgood).

In my opinion, diseases of the antrum belong to the field of the rhinologist. Only those cases that originate from diseases of the teeth or the maxilla are within the domain of the oral surgeon. Patients frequently visit their dentists on account of severe pain in one or more sound maxillary teeth that, on careful examination, will be found due to maxillary sinusitis. This is especially the case when the antrum sweeps down low over the apices. The accompanying headaches, pain on pressure on the antral wall, discharge from the nose or throat, etc., and a history of a severe cold or influenza, the most frequent etiologic factor, will establish the diagnosis. Here again, the pulp tester will prove its usefulness. A further aid to the diagnosis of cases of maxillary sinus disease is the roentgen-ray examination (sinus plates). It will help to establish, in conjunction with an examination by the rhinologist, whether or not other sinuses are involved, and whether the antrum is actually diseased as such or only acting as a reservoir for the secretions from other sinuses. The standpoint I have taken as regards diseases of the maxillary sinus can be found in an article written some years ago.[2] The differential diagnosis between cysts in the region of the antrum and a low antrum is at times difficult and, in the absence of clinical symptoms, can best be determined by intraoral roentgen-ray examination or by a stereoroentgenogram of the sinus. Cysts developing from the buccal roots of premolars and molars break very readily through the thin buccal bony wall, and then grow into the cheek. Their diagnosis depends on the findings of an intraoral bite film with the rays directed at right angles to the long axis of the tooth or teeth involved.

The great majority of cases of osteomyelitis and periostitis are due to infections developing from the teeth, the hematogenous variety and those caused

2. Blum, Theodor: The Oral Surgeon's Position in Diseases of the Maxillary Sinus. Internat. J. Orthodontia, 8: 294 (May), 1922.

by injuries being the rarer ones. The diagnosis of the average case is simple, and is readily established by a careful history and actual examination. The roentgenogram will reveal the exact involvement in the chronic cases. In infections for the ascending ramus and at the angle, the soft tissues in the region of the parotid are usually tender and reddened. To exclude simultaneous involvement of the parotid or to exclude the condition of this gland entirely, the secretion from Stenson's duct should be carefully inspected. In fact, all the salivary glands should be examined whenever the neighboring tissues are involved. If the mandible or maxilla does not present a sequestrum, and the process is rather slow and spreading, and no improvement observed, one must be suspicious and think of the possibility of industrial poisoning in addition to the infection of the bone. During the fall of 1923, there came under my observation a case of osteomyelitis of the mandible and maxilla, somewhat similar to phosphorus necrosis, that was caused by some radioactive substance used in the manufacture of luminous dials for watches. The condition has been termed "radium jaw." The roentgen-ray examination reveals no sequestrum formation, but increased density points toward increased calcareous deposits.

While, in the average case, the diagnosis of fractures of the mandible or maxilla is simple, a double fracture is not infrequently overlooked. It should be made a principle, therefore, to take four roentgenograms of the mandible, one (right and left) of the ascending ramus with articulation and posterior part of the horizontal ramus, and another (right and left) of the remaining part of the horizontal ramus and the symphysis. The maxilla as well requires complete roentgen-ray examination. At times, a dislocation of the head of the condyle constitutes a complication and should be looked at clinically as well as roentgenographically.

The roentgen-ray examination in bony ankylosis of the temporomandibular joint is difficult. A stereoscopic examination of both joints, including the coronoid process, is very helpful and sometimes indispensable. The clinical examination of the patient gives some very important points. In unilateral ankylosis, the diseased side appears healthy, and the face is filled out, owing to the fact that the mandible of the diseased side is undeveloped and, therefore, shorter. The healthy side that has grown to practically normal size seems abnormal to the inexperienced eye on account of its apparent loss of fullness. The chin points toward the diseased side (in dislocation, the condition is just the opposite, the chin pointing toward the sound side), and when the patient opens the mouth the mandible opens toward the diseased side. An old scar on the chin is the remaining evidence of an injury that caused the deformity.

Many a diagnosis of focal infection has been made without a proper study of the patient. For such a diagnosis, the examination by the oral surgeon alone is not sufficient. Not only will the general medical practitioner have to examine the patient very carefully, but many other medical and dental specialists will have to be called in consultation. Only if every part of the body has been examined and found negative and foci in the oral cavity alone remain is a diagnosis of oral focal infection possible.

There are three important sets of lymph glands that may be involved through conditions arising in the anatomic field of the oral surgeon. They are the submental, submaxillary and superior cervical glands. Diseases originating from the region of the mandibular incisors will drain into the mental glands, while infections from the remaining teeth reach the submaxillary lymph glands and, in advanced cases, the superior cervical ones. By further extension the infection can reach the

deep cervical and supraclavicular lymph nodes. Metastases occur along the same channels. Returning to the infectious cases, a simple involvement of these lymph nodes is called lymphadenitis. When the surrounding tissues are involved, one speaks of a perilymphadenitis, in which case a few nodes may be matted together. When the whole cellular system of a region is permeated and forms one hard mass, the diagnosis of cellulitis is indicated. Ludwig's angina is a cellulitis of the floor of the mouth in which all the tissues appear hard; there is little if any pus formation, and, on incision, a dark brown fluid, which has a particularly bad odor, exudes. Sublingual abscesses or any area in which pus collects in the floor of the mouth that upon drainage usually get well must not be mistaken for Ludwig's angina. I have never seen recovery in a true case of Ludwig's angina. Another invariably fatal complication arising from infections about the jaws is thrombosis of the cavernous sinus. My five cases all developed from infections in the mandible, one of them even without any surgical interference, in which case the pulp of a first mandibular molar had been capped a few months previously. The diagnosis of this thrombosis, which is rather simple, depends on ocular and cerebral symptoms. Edema of the eyelids developing from the extension of an infection into the cheek or the temporal region, which may simulate cavernous sinus thrombosis, can easily be differentiated by the absence of these symptoms and by the fact that, in cavernous sinus thrombosis, the other eye will be involved in a few days, and the patient will succumb shortly thereafter.

The presence of foreign bodies is established by means of a roentgen-ray examination. The exact location of the same depends on a stereoroentgenographic examination or the use of two roentgenograms taken at right angles to each other. A careful study of these pictures will be a great aid in the removal of such bodies.

In the examination of each patient, the following conditions must always be kept in mind: syphilis, tuberculosis and neoplasm. Their exclusion will always simplify the diagnosis.

A large proportion of the cases coming under the care of the oral surgeon will be of a type that could be considered as a sequence or consequence of treatment instituted by some other practitioner. It is then essential, as in other cases, to inquire not only as to whether the patient has pain, but also as to what type of pain is, its duration, severity, acuteness, etc. The next question is what anesthesia has been employed, whether local, conductive or general; whether a swelling was present before anything was done; whether there was a discharge from the nose or throat before certain teeth were removed, and whether, on previous occasions, the patient had a toothache or the face had been swollen. By questioning the patient and including the answers in the history, one can often avoid court procedures, which many patients, with the help of a certain type of attorney, are very prone to resort to.

A complete examination is absolutely essential not only for the diagnosis of the surgical oral lesion under consideration, but also because, through such a thorough examination, other lesions in the oral cavity or even in remote parts of the body may be detected in their incipiency. The question is often raised: How can the oral surgeon afford to have all these examinations and tests made? The only solution is the establishment of institutions in which all patients are treated alike, irrespective of their means. The larger sum paid by one patient will make up for the smaller one paid by another or will pay for the free treatment given to the third. Naturally, errors will occur, and a patient may be asked to pay a fee that is beyond his or her means; but in most instances, and

I speak from experience, patients will pay less than they can afford to or ought to pay for services rendered to them. Such an institute could also be a meeting place for specialists as well as general practitioners, where they could all increase their knowledge and experience for the benefit of their patients.

DISCUSSION

A. L. Frew: For several years, I have been associated with the Dallas Medical and Surgical Society, a group of men who limit their work to the many and varied phases of medicine, and I feel, as does Dr. Blum, that the value of the method of diagnosis and treatment outlined cannot be overestimated. A strong medical backing creates the right attitude of mind in the patient, and gives the operator the proper stimulus to accomplish results, which he might not attempt otherwise without the assistance and knowledge that these men can give. Try as we may to get away from it, the fact remains that the patient still has more faith in the physician as a rule than in the dentist. We would not care to change this point of view that the patient holds so tenaciously, while we are, in a manner, children of that great fraternity of medical brethren, and we cannot ever pay our debt to them for the benefits they have given us since dentistry became a profession.

In general, I do not believe the blood coagulation test need be made essential in diagnosis or prognosis of the oral surgical lesion. After the diagnosis is made, whether this test would be valuable would be a matter of judgment in the special instance. One probably would not abandon a surgical procedure in exposed parts or where bleeding can be controlled as easily as it can be about the oral cavity because of a delayed coagulation, particularly when the disease can be responsible for the delay in coagulation of the blood.

Can a differentiation of tumors be made on the points as given in the paper? A periosteal sarcoma may not be stony hard, and a sarcoma of the marrow need not be of liquid softness; while the benign giant-cell tumor cannot be identified positively by color. In all of these a roentgenogram is invaluable in establishing a clinical diagnosis, and a microscopic section by a pathologist of proven qualifications is essential in the final analysis.

Dr. Blum makes a statement that "only if every part of the body has been examined and found negative and foci in the oral cavity alone remains is a diagnosis of oral focal infection possible." That oral focal infection may be determined without reference to focal infection elsewhere in the body is a statement that needs no explanation. That it is wholly or even in part responsible for focal disease elsewhere or for systemic disease can be determined only by eliminating all other causes, and finally only by proof in recovery after its removal from the oral cavity.

In this part of the Southwest, one disease not mentioned in this paper presents itself to us occasionally, actinomycosis, always more or less prevalent in a cattle country, and always to be considered in any case of chronic abscess of the jaw or even of the soft tissues. In this, a history of the case from its beginning is most helpful, and a roentgenogram is very important; and while a tentative diagnosis can be made on these alone, a positive diagnosis rests absolutely on finding actinomyces in the pus from the lesion.

Earle H. Thomas, Chicago, Ill.: That no phase of the work of the oral surgeon is more important than diagnosis is well brought out in the statement of Dr. Blum that, without a correct diagnosis, no prognosis can be given, and treatment is usually unsuccessful. Having made a correct diagnosis, the treatment can always be looked up in the textbooks, but where is there a dental or medical library that furnishes a diagnosis?

Among the more important features to be considered in determining the correct diagnosis is the history of the cycle of development of the trouble complained of, and the subjective symptoms. The latter should always be recorded in the patient's own words, as stated by Dr. Blum. Such a record is very valuable in case of court procedures, and if such records are studied occasionally, they will develop one's diagnostic ability to a marked degree.

But as stated, the history including the subjective symptoms, and a perfect record of the objective symptoms, are of little value in diagnosis unless logically correlated.

Although in apparent minor conditions no special general history or complete general physical examination is necessary, in any case that presents obscure features to any degree, it is often both important and illuminating to obtain these important adjuncts to diagnosis.

In the determination of mouth conditions that may be a focus of infection affecting some other part of the body, a proper correlation of the consultation reports of the general physician and the various specialists is necessary for the proper study of the patient.

Dr. Blum has stated that in all chronic conditions we must ever have in mind syphilis, tuberculosis and neoplasm, and the importance of this cannot be overestimated.

Also, we are impressed by the ease of diagnosis by exclusion in some cases, having in mind the various diseases that the condition might be and then excluding them one by one.

Referring to sarcoma, Dr. Blum states that the outlook is practically hopeless as far as a cure is concerned. I have yet to find a pathologist who can tell me what a sarcoma is. The rule with some men seems to be that a neoplasm whose removal is attended with a cure is never a sarcoma, but an osteosarcoma, fibrosarcoma or giant-cell sarcoma, etc.; but when a patient who has been operated on for an identical condition and eventually dies from the effect of it, is said to have had true sarcoma. My mind is still open to conviction along this line. However, with sarcoma as well as carcinoma, it is most important for the oral surgeon to be able to make a diagnosis in the early stages.

One condition in the mouth that is probably a focus of infection often overlooked is a deep pocket to the distal of the lower third molar. The possibilities of absorption of large quantities of toxic material from such a focus should not be overlooked.

In regard to impacted teeth, as we generally term them, regardless of the correctness of the terminology, I am in absolute accord with the statement that, except in rare instances, they should either be placed into normal position or be removed. If allowed to remain, they can cause many serious conditions, some apparent, and some almost impossible to demonstrate until permanent and incurable pathologic changes have taken place.

In the diagnosis of antrum infection, it is my opinion that the only definite method of determining the presence or absence of infection is to puncture the antrum with a trocar and cannula, and irrigate. Roentgen ray and transillumination do not always offer a positive diagnosis because of anatomic abnormalities, and their only value is to suggest the possibility of or refute a suspicion of antrum infection. One thing that does not seem to be understood by many general practitioners is that a small film of the upper molar region is absolutely valueless in this regard. As to whether the antrum should be considered in the field of the oral surgeon, it is my opinion that this depends on the ability of the oral surgeon.

In addition to the lymphatic glands enumerated that are affected by infections of the oral tissues, I should like to call attention to a small lymphatic gland between the masseter muscle and the cutaneous tissues of the cheek that often becomes enlarged and broken down from the absorption of toxins, forming an abscess, but which has no direct relationship with the bone. Such a condition is often confused with the stripping up of the periosteum by pus from an infected third molar.

Another frequent condition that is confusing at times is the death of a large portion of the ramus or lower border of the mandible without the formation of one or more sequestrums, as is usually the case. In some of these cases, if adequate drainage is continued for a sufficient length of time, Nature will gradually dissolve the dead bone, throwing it off as pus, until there is nothing but healthy bone left.

M. C. Smith, Lynn, Mass.: The papers that have been read here today have all been from a district that I call the goiter belt. It may all be good surgery in the goiter belt, but it is not the same in the nongoitrous belt. Surgery of focal infections from that area that is so impregnated with goiter does not apply to our cases on the Atlantic Coast at all. As far as actinomycosis goes, I have not seen a case for twenty-five years, and I don't expect ever to see another. That is another local disease of the western cattle country that has been exterminated by the farmer soaking his seed grain before planting to destroy the mycoses, which does away with the smut in growing grain.

I have met the greatest difficulties in carcinoma of the tongue and jaws. I have seen many cases in consultation with physicians and dentists, and while I didn't want to say too much, I have advised consultation with the cancer specialists in the metropolis, but with the result that I didn't see the patients again for a year and a half or two years. The specialist says, "Oh, that is not cancer, that is gumma. We will treat the man anti-syphilitically and get results." Then they have left the patient too long with no other diagnosis until the case has gone so far that there was no chance for a cure. Whether there might have been in the first place or not, I am unprepared to say. The hardest thing that I have to deal with is the medical man saying that a condition is not cancer, it is gumma, when the cancer is implanted on the gumma.

Dr. Blum (closing): Dr. Frew made the statement that he does not consider it necessary to have the coagulation of the blood tested. I feel that it is a very important point, and I have this test made in more and more cases every day. In my hands, it has not been so easy to stop hemorrhage in certain cases in which the coagulability of the blood was low. The diagnosis is impossible and certainly cannot be complete unless this test is made, and it is very important for the surgeon who is to operate in the case to know the coagulability of the blood.

Furthermore, the test is easy and can be made quickly and thoroughly.

The question of diagnosis of carcinomas and bone tumors was also raised. I wish to call your attention to the fact that the title of my paper is "Important Considerations in the Diagnosis of Surgical Oral Lesions," and that it was, therefore, impossible to give all the points which make up the diagnosis of surgical lesions.

I selected these two questions of the hardness of the tumor and the softness of the sarcoma arising from the bone marrow because I have seen so many wrong diagnoses made because these two simple points in the diagnosis have been overlooked.

I am one of the few in the profession who are not so extreme or radical as far as focal infections are concerned. I have seen not a dozen but hundreds of cases in which teeth have been removed with an effort to relieve certain systemic conditions; whereas, all that has been accomplished was the loss of the masticatory apparatus. I am referring only to cases in which the teeth have been extracted without a thorough examination of the whole body.

Here, again, I want to say that not all diseases are due to focal or oral focal infection; and that no one should extract teeth without having a complete examination of the patient made.

I did not mention actinomycosis in my paper because it is one of the rare conditions, seen only in a few parts of this country, and more especially because I have never treated a case of actinomycosis.

Speaking of cure of malignant conditions, I wish to correct myself. At the present time and considering our present knowledge of malignant tumors, we are really not ready to speak of cures. If a patient, after five years, which is the present time limit, does not show a recurrence, we say that the patient is living and well, but we do not say that the patient is cured.

I am glad to know that Dr. Thomas agrees with me regarding malposed teeth, that they either have to be placed in the normal position or removed, with few exceptions. I have seen in the last few years two cases of patients, both over 60 years of age, who have never been sick a day in their lives and whose condition, after a severe infection about the jaws and glands of the neck, has finally been diagnosed as originating from partly erupted malposed mandibular molars.

Dr. Thomas also spoke of a formation at the angle of the mandible. I wish to call your attention to another condition, occurring also in my practice, which originated from a diseased periosteum causing a chronic proliferative periostitis, a thickening of the bone at the angle without any sequestral formation and with continuation of suppuration for a considerable length of time. These cases are very troublesome and discouraging.

I should like to say a word about Dr. Smith's discussion. The cancer specialist who mistakes a cancer for a gumma can hardly be called a cancer specialist. I believe that those men who, today, in the medical profession, are really cancer specialists will surely institute the right treatment and make the correct diagnosis.

To my mind, the treatment of extensive cancers or malignant tumors of the mouth is not surgery alone, but surgery plus radium and roentgen-ray treatment and it is best accomplished by one man, the surgeon who, in his treatment, includes irradiation by both radium and roentgen ray.

THE ORTHODONTIC SPHERE

By OSCAR E. BUSBY, D.D.S., Dallas, Texas

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

IT IS customary to speak of "the functions of the teeth." It may be true that, in a sense, teeth do function. But strictly and technically speaking, they are the mediums through which the vital centers of the organism function. Of all the living tissues involved in orthodontia, the tooth structure is the only one that is regarded as nonfunctional tissues.

Throughout the evolutionary development of tooth form, as well as of the histologic elements, teeth have been evolved from the simple primitive form to their present highly differentiated and complex forms. They have not done this of themselves. This power was inherent in the germ cells and was transmitted to the teeth. As the teeth underwent these morphologic changes, the surrounding structures developed in size and shape to conform with the evolution of the teeth. As changes occurred from time to time in the plasm of the germ cells, such functional needs as were anticipated were reflected in the shape and the size of the teeth themselves, through which the organism could exert its functional powers.

After the completion of the structural development of the teeth in individuals, their structural organization is complete. After this, the teeth do not change their shape or increase or diminish in size.

All growth is due to some form of stimulation, the stimulating factors being either intrinsic or extrinsic or a combining form of the two.

If the vital and physical elements of the cells and the intercellular substances composing the dental arches, face and cranium lose their equilibrium, abnormalities occur.

The inherent manifestation is more nearly constant in correct number, histologic elements and anatomic forms in the teeth themselves than in the structures that support them.

It is my observation that, in most cases of malocclusion, the conditions have been more nearly normal during early life than at a later period of development. During the period between the loss of the deciduous teeth and the eruption of the permanent teeth, there seems to come a lapse or cessation in the harmonious development of the structures supporting the teeth. It is during this period of transition that most malocclusions de-

velop; which would indicate that the inherent powers succumb to environment more readily at this age of the child.

Orthodontia has to deal with the prevention as well as the correction of conditions of malocclusion. As orthodontists have been unable to prevent many cases, it would seem to indicate that this period is the logical time to institute orthodontic treatment.

This period also affords one of the largest fields for observation and study.

Bone is the most plastic structure with which we have to deal, and after the early period of existence, its growth is stimulated by exercise, either through natural or mechanical agencies. Orthodontic appliances come within the range of mechanical agencies. In physiology, bone is secondary to muscle because the latter is functionally dominant in adaptation. When malocclusions have persisted for any considerable length of time, the muscles of mastication, the muscles of expression and the organs of respiration and deglutition have become so accustomed to their malcondition that they assume habits and characteristics that appear natural to the individual.

Therefore, the mechanical stimuli applied in an effort to correct the malocclusion should persist at intervals long enough for the organs and parts concerned to become accustomed to their new relations in form to function. For, however difficult it may be to correct the malposition of the teeth, it is vastly more difficult to establish a harmonious relation of function to form.

Usually, when malocclusion of the teeth exists, from whatever cause, the teeth are employed as points of anchorage through which artificial stimulation may be transmitted for the purpose of precipitating normal growth and function in the tissues, organs and parts that comprise the jaws, face and cranium.

In terms of the cell theory, the functions of the body are but manifest expressions of the activities of many independent but correlated centers of activity. If the cells or centers grow normally, the functions of the body are normal. But, if they fail in the performance of their offices, the functions of the body are perverted.

The cells are the active, living elements, and within them is vested all of the vital characteristics. The intercellular substances contain the physical characters.

The morphologic change involved in the treatment of malconditioned jaws, mandible, etc., is essentially biologic in its nature. The term morphologic change refers here only to the vital change in form and structure.

In modern medicine, a study of the cell structures of the tissues and organs of the body, together with cell physiology, is the rational foundation of all practice. This is also true in the practice of orthodontia, but it is just as rational and necessary to recognize its mechanical phase. "For orthodontia is the mechanical interpretation of a biological problem." (Dewey.)

Johnson says, "Orthodontic appliances may so influence the forces conditioning growth as to indirectly excite it to activity by removing inhibitions of an intrinsic nature or supplying proper nutrition. But, the idea of creating the growth impulse, or of directly making bone grow by means of mechanical devices is not reasonable."

It is recognized that it is not within the orthodontic possibility to create that which is lacking in the inherent powers of the cells. But the experiments of scientists, notably those of William Macewen[1] and Oppenheim show that bone tissue reacts directly to pressure by a transformation of its entire architecture.

There is a natural tendency for normal development in all species in their physical and structural designs. Sometimes, the slightest means of inhibition assists Nature in autocorrection. Orthodontic appliances should be used when there is no reasonable justification for such an orientation of the physical and vital cellular processes.

The entire subject may be thus summed up, briefly: "The present position of orthodontia lies somewhere between the mechanical and biological views." (Dewey.) And its sphere or purpose is not only to correct malpositions of the teeth and such facial deformities as may be presented to the eye, but to correlate a harmonious relation of the jaws to the teeth through which the physical and vital elements of the entire organism may grow and function to the best advantage to each individual.

1. Macewen, William: The Growth of Bone.

ORAL HYGIENE AND PERIODONTIA IN GENERAL PRACTICE

By OLIN KIRKLAND, D.D.S., Montgomery, Alabama

(Read before the Mississippi Dental Association, Jackson, Miss., May 19, 1925)

EXCEPT for the teachings of Dr. G. V. Black in preventive dentistry, but little attention was given the subject of oral hygiene by the dental profession until ten years ago. Since that time, interest in it has grown until, in its various aspects, it now receives more attention at our dental meetings than any other subject in dentistry. This is partly due to the fact that technical procedures have, in a measure, been conquered, and do not require the same attention as formerly from the leaders of the profession. Failures in modern dental restorations are realized to be due to faulty hygiene, or faulty diagnosis, and estimation of the resistance and vitality of the supporting tissues.

Thus, attention is veering from the mechanics of the cavity and restoration form to the means of promoting health and preventing further disease. Furthermore, the profession is being impressed with the fact that dental disease is as rampant as ever in spite of the perfection of dental technics, and that, so far, little has been done beyond repair of the ravages. A new importance has also been given to the biologic side of dentistry by the knowledge that dental disease is an important cause of ill health, and that the health of the mouth is not simply a matter of comfort and beauty.

It is the solemn obligation of every practitioner of dentistry to make a careful study of periodontal pathology, and so to familiarize himself with the early symptoms of disease that diagnosis of these conditions may be as positive as the diagnostic results where caries is concerned. This knowledge can be acquired only by a comparative study of the gingivae in a state of health, and while undergoing the primary changes of disease.

When a patient comes in for an oral examination, it is just as important that we take note of the tone and color of gum tissues and pass a probe into the gingival crevice all around each tooth for the purpose of ascertaining to what extent periodontal disease has progressed as it is to probe in the teeth for the purpose of locating cavities. We must get away from the idea that the only service expected in a general practice is the filling of cavities, extraction of teeth and construction of bridges, crowns and plates.

It is thought by many authorities that the outstanding etiologic factor in the loss of teeth that are condemned to the forceps is periodontoclasia. If this is true, it is very evident that the dental

profession is not so progressive as it should be; and I am sure that my criticism will not be considered too severe if the fact that half the teeth that are extracted are lost from periodontal disease, and but little is being done to prevent or cure it, is taken into consideration.

This would be an unjust charge if it were not possible to cure or prevent this disease, but it is now a well known and recognized fact, proved by the experience and observation of leaders in research work in periodontal pathology, that the majority of cases of this form of oral disease can be prevented or cured. The application of correct oral hygiene and the harmonizing of occlusal stress is the preventive remedy, and it must be resorted to early in life if the best results are to be anticipated.

Instruction in mouth hygiene is beyond a doubt the most valuable service the dentist can render his patient, in the practice of preventive dentistry, and the results of such teaching is very successful when the instructor is positive and forceful in explaining the reasons for giving the teeth and their supporting tissues the most careful consideration. The lack of interest on the part of the profession in preventive dentistry is not due to intentional neglect. It is perhaps due to the facts that but little attention is being given to this important branch of dentistry in the dental schools throughout the country, and that there has never been a textbook written which adequately treats the subject of periodontia. There is another outstanding cause for lack of interest in periodontia in general practice, and that is the fee for such service. Although we have not acquired the practice of making a charge for our knowledge, the dentist is just as much entitled to a fee for examination and advice as is the physician or the lawyer.

I am reliably informed that a movement is now under way by the leaders in periodontia, for the preparation of a textbook that will treat the various phases of oral hygiene, prevention and periodontia in a comprehensive manner. This same group of scientific workers will recommend to the association of dental colleges that provision be made for ample time during the collegiate course of the dental student to acquire considerable knowledge and experience in periodontal pathology.

That an ounce of prevention is worth more than a pound of cure is as true in dentistry as in the practice of medicine, but this truth is not given the same consideration in the practice of dentistry as in the practice of medicine. As an illustration of the value of prevention as compared with cure, I would call your attention to the procedure of two men whom we will presume are engaged in the practice of medicine in adjoining communities: We will suppose that one of them has acquired the utmost degree of skill in the treatment of preventable diseases. He enjoys a remarkable degree of success in handling the cases of the unfortunate ones to whom he ministers, but knows nothing of the science of prevention, and does nothing to prevent the spread of disease. The other one, we will assume, is lacking in ability to treat his patients successfully when affliction befalls them, but is well versed in preventive practice and is but seldom called to the bedside to minister to his clientele. Which of these two men is rendering the higher type of service to humanity?

Notwithstanding the fact that dentistry has made rapid strides forward and has become indispensable to the

comfort and health of humanity, as practiced today it is about 50 per cent failure, and it cannot assume its true professional importance until we, as a progressive profession, recognize the necessity of following the example of the medical profession in the application of preventive measures.

Failure to prevent disease in the mouth, by methods now in use, is due to failure in diagnosis of early manifestations of the disease and lack of interest in oral hygiene. Periodontal disease is generally recognized by the dentist when his attention is called to it by the patient, and that is usually when there is visible pus, inflammation and mobility of the teeth. A diagnosis should be made when the disease first manifests its presence and measures inaugurated to prevent its further development.

The general practitioner can, and should, apply the principles of oral hygiene, and although he may not practice periodontia, he should know periodontology, so that he may be capable of rendering service to those who have developed the primary stages of periodontal disease. The periodontologist cannot serve all those who are in need of such service because of the limited number of competent specialists in this field of dentistry; therefore, if we get anywhere in promoting health in the human mouth, it must be done through the concerted efforts of the dental profession, with the cooperation of the medical profession.

The successful treatment of the early lesions in periodontal disease is not such a difficult problem, and there is no reason why every practitioner of dentistry should not handle his own cases. The chief cause of failure in preventing this disease is not a lack of skill on the part of the average practitioner of dentistry, but a lack of knowledge of periodontal pathology.

Another cause for failure in the treatment of these conditions is the reliance on drugs to accomplish the result desired. Medicinal remedies are ineffective in this disease and should be given no consideration whatever. We may use mild antiseptics to irrigate affected tissues as a general routine in surgical treatments, but strong drugs are not only unnecessary, but are also positively contraindicated, and the operator who persists in their use will defeat his own efforts. There has always existed a false impression among practitioners of dentistry, as well as in the mind of the laity, that disease of the periodontium can be cured by the use of mouth washes or the application of strong drugs to the diseased areas. The sooner we get the drug treatment idea out of our minds, the sooner we will be in position to render worth-while service to those who entrust the health of their mouths to our skill and judgment.

The first step to be considered in the successful treatment of primary periodontal lesions is diagnosis. The suspected teeth should be studied for occlusal disharmony and any trauma corrected. Thorough odontexesis (prophylaxis) is the next step. It may require painstaking effort to remove all stains and deposits from the exposed surfaces of the teeth, but this should be done, any detritus that may exist in the gingival crevice being removed also. The patient may then be given instruction in the care of the teeth and gingivae. Most patients refrain from brushing the gums, because, they tell us, it makes them bleed. The patient does not realize that stimulation produced through vigorous brushing of the dis-

eased gingivae will restore these tissues to a state of health. Great stress should therefore be laid on the importance of brushing the gingivae as well as the teeth. Since, owing to the dietary habits of civilization, the supporting structures of the teeth do not get sufficient exercise to encourage free circulation of blood in these tissues, it is necessary to supply these parts with healthy blood by some artificial means. This may be accomplished by vigorously brushing the gums with the same effort used in brushing the teeth. Too much emphasis cannot be laid on the importance of brushing the gingivae as well as the teeth, and this habit must be firmly fixed in the mind of the patient if we are to anticipate permanent results in maintaining health in the oral cavity.

Since occlusal disharmony is perhaps the most important etiologic factor in the development of periodontoclasia it should be given first consideration.

A thorough knowledge of traumatic occlusion and methods of grinding the teeth is necessary in the correction of occlusal trauma, as there is danger of grinding the teeth in such a way as to destroy completely normal cusp antagonism and thereby render the patient permanently uncomfortable. I have known instances in which the patient complained that there was no position in which the teeth could find occlusal rest. In view of such complications arising from injudicious grinding, it may be preferable to stop a little short of what we might consider perfect restoration of occlusal function.

Finger palpation of the suspected teeth during the exercise of the occlusal movements of mastication will nearly always reveal which teeth are most seriously involved in traumatic occlusion. In grinding, flat surfaces must be avoided, as exposure of the dentin would produce sensitiveness without restoring normal cusp form. This may be obviated by handling the stone with light pressure and using a rotary movement of the stone throughout the operation.

The establishment of a hygienic condition of the mouth through the application of prophylactic treatment is the next consideration in the management of any periodontal lesion. All deposit stains and roughness should be removed, from the tooth surfaces down to the extreme depth of the gingival crevice. Prior to the development of modern methods of treating periodontal disease, it was customary for the leaders in this branch of dentistry to lay great stress on highly polishing the surfaces of the teeth. This has been proved unnecessary. It is of course, important that the exposed tooth surfaces be made smooth, but it is useless to spend hours of laborious effort in polishing the teeth until they shine like a mirror.

Periodical treatments, perhaps three times weekly, should be given, at which times small bladed curets may be carefully passed into the gingival crevice all round each tooth for the purpose of removing any deposit or roughness existing on these surfaces. In following this procedure, great benefit results from stimulation induced by forcing the diseased blood out of the congested tissues. This is undoubtedly as valuable in promoting health in the gingivae as is the removal of the irritants.

If the treatment outlined is followed in those cases generally known as gingivitis, which is nothing more or less than the primary stages of what is commonly recognized as pyorrhea, an absolute cure of this disease in its early manifestations should result, and continued stim-

ulation of the gingivae by the patient should maintain a permanent state of health in the supporting structures of the teeth.

The outstanding, and most unbelievable, cause of failure in the permanent relief of periodontal disease is reflected in the instructions given the patient in the home care of the mouth. This part of the procedure seems very simple and no doubt is given entirely too little consideration by the majority of those who fail to secure permanent results in the handling of such cases. I lay great emphasis on the fact that failure is due to lack of appreciation of the importance of educating the patient in the home care of the mouth. Impressions that are to exist in the human mind throughout life must be deeply impressed on the consciousness of the individual. If the habit of correct oral hygiene is ever permanently fixed in the mind of your patient, it must be done through forceful argument and careful teaching. Simply instructing the patient in one short sentence to brush the teeth with an up and down movement or rotary movement of the brush will not suffice. The patient forgets, and loses interest, in about the same length of time that it takes to give such instructions, and he continues to care for the mouth in the old careless way, which is but little better than no effort at all. No matter how much filth is permitted to accumulate in the mouth, owing to lack of knowledge as to the correct use of the toothbrush, if the patient makes any effort at all at cleaning the teeth, there exists a false impression that the brush is being used correctly and that the mouth is kept in a hygienic condition, and he cannot understand why disease, if it is caused by neglect, should have developed in his mouth. Observation in a Pullman car of the average person brushing the teeth gives a very good idea as to the manner in which mouth hygiene is practiced in general: a few vigorous horizontal rubs over the smiling surfaces of the incisors and cuspids, and the operation is complete.

The methods of prevention that are now being practiced in mouth hygiene by the people in this country have been proved by the test of time an utter failure, and no group of individuals knows this fact so well as those engaged in the practice of dentistry. If there is ever a change for the improvement in present methods of preventing disease in the human mouth, it must be accomplished through the efforts of those who have assumed the obligation of protecting the health of the human oral cavity. If periodontal disease can be prevented, and in the majority of cases it can, some one is to blame for the appalling loss of teeth, and the ill health that results to the people whom we serve, from these preventable diseases.

Every practitioner of dentistry should practice on the theory that preventive dentistry is less expensive to the patient, and infinitely more valuable, than reparative dentistry.

THE IMPORTANCE OF EARLY ORTHODONTIC DIAGNOSIS

By A. C. ROHDE, B.S., D.D.S., Milwaukee, Wisconsin

WE ARE living in an age of prevention. This is true not only of the sciences of dentistry and medicine, but of industrial, civic and social life as well. Only recently, an entire week was devoted to "fire prevention," another to "safety first," and another to the drive of the Wisconsin Antituberculosis Association. These and other similar activities which might be mentioned serve to show that prevention is the watchword of the hour.

It is indeed sad to see the hundreds of school children who are growing into manhood and womanhood with frightful evidences of malocclusion and facial deformities. To lay the responsibility for all of this at the door of the dental profession is a gross injustice. Nevertheless, the early diagnosis of malocclusion has not been made by the average practitioner. Parents who entrust their children to the care of a dentist are entitled to, and deserving of, the proper kind of advice. Such soothing statements as "Nature will take care of that" or "Wait until all the permanent teeth are erupted," have done more harm than many of us realize.

To appreciate fully the advantages that may be gained by early diagnosis and treatment, let us first turn our attention to the deciduous denture at the time prior to the eruption of any of the permanent teeth. The deciduous denture with its twenty teeth does not usually show the irregularities found so frequently in the permanent denture. Unless there are disturbances of a systemic nature, such as rickets, syphilis, tuberculosis or nasal obstructions, one may look forward to an occlusion that will be anatomically correct. Prior to the age of 6 years, children should have arches sufficiently developed in size so that there will be spaces between the teeth. Should this not occur, it is a sign that the arches are not developing along correct anatomic lines. In such a condition, the permanent teeth will have a tendency to be crowded and overlapped (Fig. 1).

In order to make an early diagnosis in cases of malocclusion, it is necessary to know the causes of this condition. When these are recognized, efforts should be directed toward either their removal or treatment.

Mouth breathing is usually caused by adenoids and enlarged tonsils, which frequently obstruct the nasal passages; and thus the growth of the deciduous arches is arrested. As a result, the teeth will be in close contact at a time when they should begin to spread and produce the growth spaces that are so necessary for room for the permanent teeth. These cases should be given immediate attention. The child should first be examined for adenoids and for enlarged and diseased tonsils. If these are found, they should be removed and the decidu-

ous arches expanded to a degree that will allow the permanent teeth to erupt in correct position.

In cases of this kind, rhinologists should be reminded that the removal of adenoids and tonsils will not entirely correct the mouth breathing. While we admit that the removal of the primary condition is necessary, the contracted arches will not give room for the tongue when the mouth is closed; and the tongue, being forced against the pharyngeal wall, will shut off the flow of air

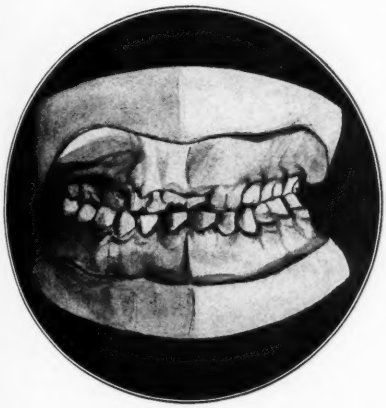

Fig. 1.—Deciduous arches, showing lack of growth spaces between the anterior teeth.

through its normal channels. These are the cases in which orthodontic treatment as an adjunct to rhinologic treatment will materially assist in establishing nasal breathing and normal eruption of the permanent teeth (Figs. 2 and 3).

The importance of preserving the structure of the deciduous teeth cannot be overestimated. The general question is: why waste money for filling teeth that will soon be lost? This idea is erroneous. Not only does decay ultimately cause death of the pulp with its accompanying infection, but it also often causes complications of a systemic nature. Interproximal decay destroys one

Fig. 2.—Model of a case of a mouth breather. The constricted upper arch, preventing the tongue from assuming its natural position, may be noted.

of the main forces of occlusion; namely, the loss of the interproximal contact.

Fig. 3.—Model of case (Fig. 2) after expansion.

This brings us to one of the most common causes of malocclusion, the early loss of deciduous teeth. If for any

reason it is necessary to extract a deciduous tooth before its normal shedding, we must think of more than the mere riddance of the offending member. We must find by clinical and roentgen-ray examination the position of its successor, and then determine what the consequences will be within one, two or three years if the condition is left untreated. Usually, the space closes, and an underdeveloped arch is the result. This may best be illustrated by the early loss of the deciduous cuspids; e. g., in the eighth or ninth year. The bicuspids and molars tend to shift mesially, and the incisors distally to a point where bicuspid and lateral meet, thereby closing the space that belongs to the permanent cuspid. As a result, the arch is shortened, and the permanent cuspid either will fail to erupt or will make its appearance inside or outside the arch (Fig. 4). This tooth has a tusklike appearance and is in infralabioversion. In case the tooth fails to erupt, it may remain embedded in the jaw during the life of the patient. Occasionally, such a tooth develops a follicular cyst, which in its growth may invade the floor of the antrum or nose. This condition can be remedied only by surgical care. I cite this particular case because it is of common occurrence, and dentists are all familiar with such a condition.

The point I wish to call to your mind is this: If a tooth erupts and occupies the position of another tooth, malocclusion becomes progressive; for example, in the case of loss of a cuspid. The first bicuspid takes the place of the cuspid, the second bicuspid that of the first bicuspid and the molar that of the second bicuspid. Therefore, in cases of early loss of any of the deciduous teeth, it is most important that the space be retained by a small retaining appliance that will keep the space open and prevent the development of malocclusion (Fig. 5).

Unfortunately, we occasionally find cases in which children, through accident, have knocked out one or more of the anterior teeth. Dentists should not

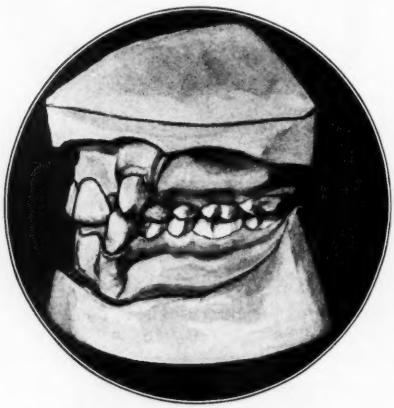

Fig. 4.—Model showing result of early loss of deciduous cuspid. The approximation of lateral and cuspid may be noted.

Fig. 5.—Soldered lingual arch retainer where deciduous teeth have been extracted anteriorly on either side.

belittle a traumatic condition of this kind, but should emphasize to the parents the importance of keeping the space open, neglect of which may retard the normal eruption of the permanent teeth. In case they should erupt, they may come in crowded, overlapped or within or outside the arch line. In the time that I have been practicing, I have yet to see a single appliance that was inserted for space maintenance.

The loss of the second deciduous molar before the eruption of the first permanent molar brings on greater com-

Fig. 6.—Model showing the loss of the upper deciduous second molars allowing the first permanent molars to move mesially.

plications. In this case, it is difficult to maintain space as there is no way of attaching an appliance until the first permanent molar erupts, and then it may be that it has already moved forward (Fig. 6). More consideration should be given to spreading the gospel of diligent and due care to the preservation of the deciduous teeth. However, prolonged retention of the deciduous teeth is a factor that must not be overlooked in the practice of dentistry. Frequently, we find cases in which patients do not shed the teeth at the proper time. Such a condition will prevent the permanent teeth from erupting normally, and may bring on malposition that will have to be remedied by orthodontic means.

Fig. 7.—Supernumerary tooth lingual to upper left central.

Supernumerary teeth frequently cause malocclusion by occupying a position be-

Fig. 8.—Supernumerary tooth lying between the two upper centrals.

longing to another tooth, causing the latter to assume an abnormal position or to remain impacted (Fig. 7 and 8).

The first permanent molars, because they are the first permanent teeth to erupt, are often neglected until caries has made serious inroads upon them, when they must of necessity be extracted. The result is that the second permanent molar tips forward when erupting, and the teeth anterior to the first molar tip backward, the occlusion thus being destroyed (Fig. 9).

Frequently, cases present an abnormal attachment of the labium frenum, which usually causes a separation of the upper central incisors. The frenum may be normal in the deciduous denture, but as the alveolar process grows downward, or away from the attachment, in abnormal cases, the frenum continues to grow with it. As a result, the attachment is between the teeth, causing a space (Fig. 10). Occasionally, this condition is found in the lower lip, but it is more common in the upper.

Fig. 9.—Model showing a case resulting from early extraction of permanent teeth (after Federspiel).

Fig. 10.—Abnormal frenum causing wide separation of centrals.

The bad habits that children are liable to acquire, such as thumb sucking, and lip sucking, are important factors in bringing about irregularities of the teeth. Unless the habit is checked early, it is liable to cause malocclusion not only of the deciduous teeth, but also of the permanent teeth, and it is ofttimes accompanied by serious facial deformities. This is readily accounted for when we consider that the erupting teeth, seeking their position in the arch, are surrounded by newly formed and yielding alveolar tissue, and are easily diverted from their course by any force exerted on them.

In cases of thumb sucking, which is probably one of the most pernicious of all habits, the deformity is in a great degree determined by the position of the thumb in the mouth. The severity of the deformity is largely determined by the length of time the habit is indulged in. I will illustrate with the case of a boy 4 years old who continually sucked his thumb (Figs. 11 and 12). He rested the dorsal surface of the thumb against the lower incisors, and the ball against the upper incisors, forcing the latter into labioversion, and the former into linguo-

version. This caused a marked depression of the labiomental sulcus. In case

Fig. 11.—Profile of a child four and a half years old. The marked depression of the mentolabial sulcus, due to thumb sucking, may be noted.

Fig. 12.—Models of the same child (Fig. 11) showing distoclusion and upper protrusion.

the thumb is held in a horizontal position, there is a tendency to what is called an open-bite malocclusion.

In cases of lip sucking, usually all of the incisors are affected. The lip is drawn into the mouth over the lower teeth, forcing them lingually. The upper incisors are forced labially, and are thus given them unnatural prominence.

Another habit that is a factor in malocclusion is the assumption of a

Fig. 13.—Model illustrating the habit of resting the chin in the palm of the hand when sitting and reading.

particular position when reading or studying. Children sit with one leg crossed over the knee, with the hand over the chin, and with the elbow resting on the knee (Fig. 13). Or, they may have the habit of reading in bed, lying flat on the abdomen, resting the chin in both palms and elevating the upper part of the body by resting on the elbows (Fig. 14). Both of these habits exert a pressure on the developing and yielding mandible, and may, in the course of time, produce a distoclusion.

Cleft palate is a congenital condition

that usually interferes with the development of the maxilla. If it remains untreated up to the time when all the permanent teeth are erupted, it is sure to cause malocclusion, or what is known as maxillary micrognathia (Fig. 15 *a* and *b* and Fig. 16.) The treatment in such a case usually falls to the oral surgeon, with orthodontic treatment following. If it is treated early, the prognosis is usually quite favorable.

Having now completed a brief survey of the local causes of malocclusion, we

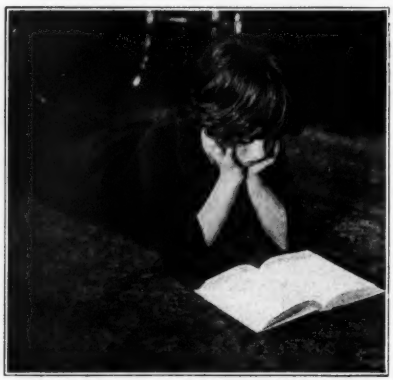

Fig. 14.—Model illustrating the habit of resting the chin in both palms when lying on the abdomen and reading.

must recognize that in certain cases other conditions will be found to play a part. Each case must be studied carefully and every effort made to find the etiologic factor that has been responsible for the deformity.

One of the greatest factors in the production of malocclusion today which act in a constitutional manner is diet in its effect on the teeth and jaws directly, and on the body as a whole. Too many children of today do not receive the food essential for the development of osseous structures and calcified tissues. As a result of improper diet, lack of proper usage of the jaws, and teeth in turn,

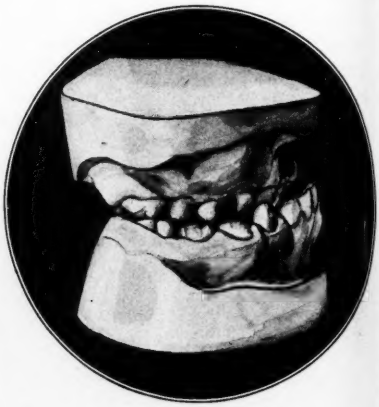

Fig. 15.—Models of a cleft palate case, the condition resulting in maxillary micrognathia.

causes loss of circulation to the parts, which keeps these organs from attaining

Fig. 16.—Models of a cleft palate case (Fig. 15) causing a maxillary micrognathia; occlusal view.

their maximum efficiency. Consequently, the muscles do not develop properly and the entire face and jaws of the child are

affected because of this decrease of function. We see children who have normal deciduous arches as far as shape of the teeth and jaws is concerned, and everything indicates a normal permanent dentition. However, the child does not seem to develop, his face does not grow, and

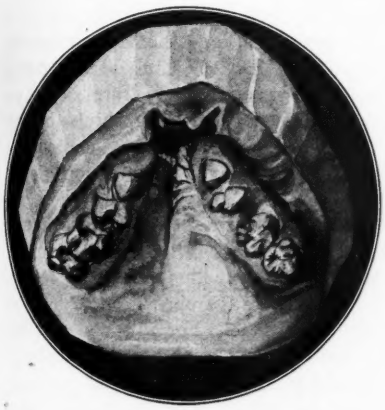

Fig. 17.—Palatal view of cleft palate showing absence of premaxillary bone.

the dental arches are not developed to accommodate the permanent teeth. This is the result of faulty cell metabolism and failure to grow, produced by lack of function.

There are orthodontists who believe that the normal development of the jaws is impeded by artificial feeding of the infant in place of breast feeding. Anyone who has carefully observed an infant at the breast of its mother will have noticed the effort and muscular activity necessary in order that the food may be obtained. This functional activity is, in a great degree, responsible for normal development.

It has long been recognized that systemic disturbances have a great effect on the development of tissue. It is, therefore, rational to assume that, in disorders of this kind, the bony structures of the maxilla and mandible are affected in their development. Infectious diseases of childhood are also responsible for impaired development of the structures.

In calling attention to all the causes of malocclusion that manifest themselves during tooth eruption, we see that the majority of malocclusions can be prevented by the proper care of the deciduous teeth. This conclusion we must admit and we can corroborate; yet the care of the deciduous denture is usually disposed of with the casual remark, "They are only temporary teeth, and will be lost before long anyhow."

We feel that the deciduous teeth have not received the proper attention, in spite of the public clamor for enlightenment concerning them. It is time that we give to our patients those principles of prevention that we know to be scientifically correct.

THE DARK FIELD MICROSCOPE IN PYORRHEA AND ORAL INFECTIONS*

By T. D. BECKWITH, Ph.D., Berkeley, California

IT appears rational to apply the same conception to a pyorrheal lesion as we do to a wound, but with the difference that this particular wound circumscribes a body that is, temporarily at least, foreign. This foreign body is the exposed portion of the tooth. In the case of a lesion found in the conditions of war, one ordinarily is able to remove extraneous materials, after which healing takes place in its natural sequence. In pyorrhea, however, our endeavor must be to induce healing without removal of the foreign surface presented by the tooth. In case of extraction, repair takes place readily. The difficulty is to bring about regeneration of tissue with the tooth left in situ. That granulation and regeneration is possible has been indicated from the observations of Hanford, Patten, Westbay and Simonton.[1]

Such healing as may follow in pyorrhea must take place by second intention, inasmuch as we have continually present a large number of microorganisms that constantly are causing liquefaction of recently formed structures. On the other hand, in due course of the processes of repair, the body is persistently forming granulation tissue and is combating infection. We endeavor to further these efforts by such means as shall tend to produce a clean surface of the tooth in order to reduce to a minimum the opposition to healing in the gingivae. For this end, scaling by instruments, simple surgical methods, irradiation and, conservatively, germicides are used. Better still is a combination of these various procedures.

One must constantly bear in mind the fact that the flora present in pyorrhea is most diverse and that it alters. Conditions for efficient control thus are exceedingly difficult on account of a number of factors. Flushing by mouth fluids removes the detritus of bacterial action with the result that substances self formed by the organisms and which are auto-inhibitory are uninterruptedly removed. Therefore, multiplication continues with additional ease. This constant access and drainage of fluid is accompanied by drenching of bacteria produced elsewhere in the oral cavity. Inasmuch as the saliva is an efficient buffer, conditions again are made favorable for bacterial action and multiplication. Thus acidity is ephemeral. Phagocytosis in mouth fluids ap-

*From the Department of Bacteriology, University of California, Berkeley, California, and California Stomatological Research Group.

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1. Hanford, W. H.; Patten, C. O.; Westbay, C., and Simonton, F. V.: A Contribution to Our Knowledge of Pyorrhea from the Standpoint of Histo-Pathology, Dental Cosmos, 65: 3-8 (Jan.) 1923.

pears to be limited. Increasing evidence regarding this last point accrues from the work of Kreumwiede[2] and Pratt in their reported negative results obtained by the use of vaccines for pyorrhea. In addition, the constant precipitation of calculus acts for irritation to tissues. The summation of all of these factors is that not only do we have a wound condition accompanied by healing by second intention and which is very slow at best, but this very status is an exaggerated one.

It will be recalled that during the recent war certain very definite measures of observing the flora in wounds were followed. Stained smears were made daily from the sites of infection in such traumas in all properly equipped hospitals. The numbers of organisms and their morphology were tabulated. Closure was not allowed until it had been shown that no organism had been microscopically discernible over a considerable period. The forms that are present in such wounds are easily demonstrable by means of stains, but those that are in mouth lesions are, many of them, visible only with difficulty by tinctorial procedures. Therefore, even when it is possible to apply such measures to the mouth, we should encounter grave difficulties. Nevertheless, it appears to be only logical to use some method of control during the process of treatment in pyorrhea. Much can be learned by observing the forms and relative numbers of organisms present, especially in the depth of the pocket.

For the purpose above noted, it has been found that the ordinary dark-field microscope, to which recourse is often had in infections when it is believed that spiral-formed organisms are present, is a most usable and adaptable instrument. The preparation of a smear for the dark field is not at all difficult. It is necessary only to remove a little of the detritus from the depth of the pocket by means of an ordinary scaler previously heated in the instrument sterilizer. This is macerated in sterile physiologic sodium chlorid solution; the cover slip is dropped on, and examination follows immediately with the oil immersion lens. Organisms and organic matter show up brilliantly against the black background. Either true motility or brownian motion is apparent at once. It is advisable to make use of one of the more recent built-in electric illuminators and dark-field condensers such as are produced by Bausch and Lomb Optical Company or by the Spencer Lens Company.

Through the courtesy of J. A. Johnston(warden), and Dr. L. L. Stanley, it has been possible to make a series of dark-field examinations in the dental clinic of San Quentin Penitentiary, on patients undergoing treatment for pyorrhea by Dr. W. H. Hanford. We have been enabled to include a series of observations at frequent intervals during the course of such treatment. At the beginning of treatment, the number of organisms present in a pyorrheal pocket is enormous. Great quantities of spirals are to be seen. They are accompanied by many diverse rods and by great numbers of cocci. During the course of treatment, it has been demonstrated that, first of all, the spirals diminish. Following these very closely are the larger rod forms. Finally, the micrococci in turn approach the minimum. We have carried through such observations in certain of the cases and find that the dark-

2. Kreumwiede, C., and Pratt, J. S.: A Bacteriological Study of Pyorrhea Alveolaris and Apical Abscesses in Relation to Vaccine Therapy, Collected Studies Bur. of Lab., City of N. Y., 8: 166-170, 1914-1915.

field microscope therefore is readily adaptable as a means of control, allowing the operator to observe at any time the bacteriologic flora of the tissue with which he is working. Additional advantage lies in the fact that the operation of such an instrument is exceedingly simple. Results may be obtained with very little time, only a moment or so being necessary, and finally the organisms present are viewed while still alive and with the least possible distortion. We find it advantageous, therefore, first, to consider the lesion in the light of a wound and, second, to apply the control measures similar to those that are used in war practice. Inasmuch as staining is not effective, the dark-field apparatus is valuable.

It is suggested, moreover, that workers interested in the laboratory side, as well as that of the clinician recognize the fact that the dark-field microscope is most valuable likewise for examination of certain other conditions of the mouth, such as gingivitis and Vincent's infection. Here the same procedure may be used. A certain small amount of the exudate placed in a droplet of saline and used with the indirect illumination of the dark-field condenser shows the spirals and rods at once.

By use of the dark-field apparatus, then, it may be demonstrated with ease that progress in healing of the open lesion of pyorrhea is attended by marked diminution of the bacterial forms present. Conversely, the dark-field equipment is a valuable accessory to the dentist's equipment, since it gives certain valuable information regarding the condition of the lesion itself.

TRAUMATIC DEAFNESS CAUSED BY THE RETRUSION OF THE CONDYLES OF THE MANDIBLE ON THE EXTERNAL AUDITORY CANAL

By H. F. McGRANE, D.D.S., Sioux City, Iowa

(Read before the National Society of Denture Prosthetists, Dallas, Texas, November 7, 1924)

THIS report covers observations made since June, 1923.

The temporomandibular joint is, according to Prentiss, "A gliding hinge joint, or gliding movable joint. The surfaces entering into this movement are the elliptical condyle of the mandible and the glenoid concavity of the temporal bone continuous with the eminentia articularis convexity. In other words, a convex circumscribed surface articulating with a concave-convex surface. Interposed between the condyles of the mandible and the concavoconvex surface of the temporal bone is a fibrocartilage meniscus which adjusts itself to the movements of the condyle."

All joints with a free gliding movement present such a meniscus, as the sternoclavicular and the femorotibial joints.

Prentiss[1] calls attention to the absorption of the meniscus, in various degrees, due to loss of teeth.

The eustachian tube passes through a canal just internal to the condyle, and on the outer side of the eustachian tube lies the chorda tympani nerve. The tympanic portion of the temporal bone is in front of the petrous portion and forms all but the roof of the bony portion of the external auditory canal. The part that forms the anterior wall of the auditory canal and the tympanum is called the tympanic plate. This plate is thin and separates the bony portion of the external auditory canal from the glenoid fossa.

When the condyles of the mandible are habitually retruded, the pressure causes a gradual absorption, not only of the interarticular fibrocartilage, but also of the structures surrounding the joint, which may include part of the tympanic plate, opposite the point of greatest pressure. The condyle, because it is in such close relationship with the cartilaginous portion of the canal, causes a compression of the external auditory meatus, which often varies from a slight flattening of the anterior wall to practically complete closure of the auditory canals, as in Cases 2 and 7, here reported.

It is my belief that traumatic deafness, which Dr. Wright of Pittsburgh has named, is the result of malposition of the mandible existing over a period of years, due to the gradual abrasion or erosion of the natural teeth; loss of several or all of the teeth, or faulty restorations, operative or prosthetic.

1. Prentiss, H. J.: Dent. Cosmos, 60: 505 (June) 1918.

REPORT OF CASES

CASE 1.—*History.*—Mrs. G. A. T., aged 35, seen June 27, 1923, complained of impaired hearing dating back twelve years, and gradually growing worse. In 1919, lower posterior stationary bridges were inserted from the second bicuspid to the second molar on the right and left sides, and the cuspids and bicuspids were ground off so as to permit incisal contact of the upper and lower incisors; in other words, the distance from the nares to the symphisis was decreased. The patient had been an elocutionist on the Chautauqua platform, but because of the loss of her hearing, she was compelled to give up the work. She had considerable difficulty in carrying on a conversation.

Examination.—The general appearance was one of marked depression. Results of tests were as follows: whispers heard, right ear, 10 inches, left ear, 8 inches; watch, right ear, 4 inches, left ear, on contact; C-2 fork (512 vibrations), right ear, air conduction, twenty seconds, bone conduction, 20 seconds; C-2 fork, left ear, air conduction, fifteen seconds; C-2 fork, bone conduction, fifteen seconds. Examination of the membrana tympani showed the area of light reflex reduced in both ears, and the left external auditory canal smaller than the right, with marked retrusion of that condyle, more so than on the right.

Treatment.—An intermaxillomandibular splint was made, increasing the distance 5 mm. between the maxilla and the mandible, for the patient to wear all of the time.

Course.—Jan. 19, 1924: The general appearance was much improved and the patient was more lively in every way. She was able to carry on conservation perfectly without effort. Tests revealed: whispers heard at 2 feet with either ear; watch, 18 inches, with either ear; C-2 fork, each ear, air conduction, thirty-five seconds; C-2 fork, bone conduction, twenty seconds. The left auditory canal was much larger.

June 19, the condition was practically the same.

CASE 2.—*History.*—Mrs. J. M. K., aged 56, seen March 13, 1924, stated that her hearing had been gradually getting worse for the past five years. She complained also of intermittent roaring in both ears.

Examination.—Tests revealed: whisper heard, right ear, 4 feet, left ear, 10 feet; watch, right ear, 4 inches, left ear, 6 inches; C-2 fork, air and bone conduction reduced in both ears. Both external auditory canals were completely occluded and there was marked retrusion of the condyle head. The patient had lost all of her teeth twenty-five years before and had worn full upper and lower dentures for twenty years. The lower third of the face showed marked shortening.

Treatment.—New full upper and lower dentures were constructed increasing the distance between the maxilla and the mandible 7 mm.

Course.—May 19: The patient now was able to hear whispers with the right ear, at 9 feet; left ear, 15 feet. She stated that she was able to hear general conversation much better and did not have so much roaring in her ears. Sounds were much clearer and were not muffled as formerly.

June 20: Air and bone conduction for the C-2 fork was practically normal. Whispers could be heard at 20 feet with either ear.

CASE 3.—*History.*—Mrs. W. H. B., aged 55, seen May 12, 1924, had been deaf for twenty-eight or thirty years. Head noises were present most of the time. She had worn full upper and lower dentures for thirty years.

Examination.—The patient could not hear the C-1 or C-3 fork by air conduction. The C-2 fork could be heard by bone conduction with both ears. She stated that her hearing had been worse since the last set of dentures were made, five years before. There was marked retrusion of the condyle in both ears, more marked in the left, and also very marked shortening of the lower third of the face.

Treatment.—New full upper and lower dentures were constructed, the distance between the maxilla and the mandible being increased 14 mm. more than in the dentures she had been wearing. The distance from the crest of the maxilla to the mandible was 32.5 mm.

Course.—After wearing the new dentures eight days, the patient could hear the C-2 fork, air conduction, at 2 inches for a few seconds; bone conduction, more acute and time increased. She could also hear the

C-1 fork, right ear, bone conduction, for a very short time.

June 6: The patient reported by letter that she could hear the clock strike for the first time in twenty years. The following is an extract from a letter received from her husband:

"That Mrs. B. can hear better, especially with her right ear, there can be no doubt. It was a comparatively short time until she could notice certain class sounds that she had not heard before; such sounds as the children calling to each other, her grandchildren whistling, meat popping while frying on the stove, etc. Two days ago she heard the clock strike."

September 11: The patient stated that she undoubtedly could hear much better and that she carried on conversation with ease. She had joined a card club, something she had been unable to do previously because of her loss of hearing. Tests revealed: C-2 fork, right ear, air conduction, fifteen seconds, bone conduction, eighteen seconds; C-2 fork, left ear, air conduction, seven seconds, bone conduction, fifteen seconds.

CASE 4.—*History.*—Mr. J. T. N., aged 54, seen March 19, 1924, complained of impaired hearing, worse in the left ear. He could not hear over the telephone or in a crowd. The upper and lower teeth had been absent for several years, possibly twelve or fourteen years. He had worked in a foundry for about twenty years.

Examination. — Tests revealed: watch, heard, right ear, on contact, left ear, not at all; C-2 fork, air conduction, right ear, twenty seconds, left ear, 15 seconds. Bone conduction in both ears was nearly nil. The patient could not hear whispers. The membrana tympani was slightly thickened and full in appearance. The ossicles appeared ossified.

Treatment.—Full upper and lower dentures were constructed and normal facial measurements restored.

Course.—June 2: The patient stated that if he left the dentures out at night, he did not hear so well in the morning. There was no other noticeable change except an increase of five seconds in the hearing of C-2 fork by bone conduction in the right ear.

CASE 5.—*History.*—Miss L. H., aged 40, seen May 26, 1924, stated that her hearing had been impaired for a long time, gradually growing worse for the past ten years. All of her natural teeth were in position, except the lower first molar.

Examination. — Tests revealed: watch heard on contact, both ears, faintly; whispers, right ear, 3 feet, left ear, 2 feet; C-2 fork, right ear, air conduction, five seconds, bone conduction, twenty seconds; C-2 fork, left ear, air conduction, unable to hear; bone conduction, twenty seconds. Inspection of the membrana tympani revealed marked lessening of the areas of light reflex, and marked retrusion of the condyles on both sides, with flattening of the anterior wall of the external auditory canals.

Treatment.—An intermaxillomandibular splint was constructed, increasing the distance between the maxilla and the mandible 5 mm.

Course.—June 20: The patient had worn the splint about four weeks. The only change noted was an increase of 18 inches in the distance at which she could hear whispers.

CASE 6.—*History.*—Mrs. J. M. F., aged 38, seen June 10, 1924, complained of impaired hearing, first noticed about one year before when she began wearing full upper and lower dentures, and gradually getting worse. There was marked grinding and cracking of the meniscus on opening and closing the mandible.

Examination.—There was retrusion of the condyle, more marked on the right side. Tests revealed: whispers heard, right ear, 2 feet, left ear, 8 inches; watch, right ear, 2 inches, left ear, 3 inches; C-2 fork, right ear, air conduction, twenty seconds, bone conduction, eighteen seconds; C-2 fork, left ear, air conduction, twenty-five seconds, bone conduction, twelve seconds.

Treatment.—New upper and lower dentures were constructed, the distance between the maxilla and the mandible being increased 7 mm.

Course.—June 28: The patient stated that she did not notice the grinding and cracking sound when opening and closing the mandible. She had worn the new dentures two weeks and could hear whispers at 3 feet with either ear.

August 14: The patient could now hear whispers at 7 feet with either ear.

CASE 7.—*History.*—Mrs. A. M. K., aged 68, seen July 25, 1924, complained of impairment of hearing for a period of twenty or twenty-five years. There was slight clicking on closing the mandible, more marked on the left side. The auditory canals were completely occluded.

Examination — Tests revealed: watch heard, right ear, on contact; C-2 fork, air conduction, eighteen seconds, bone conduction, ten seconds, whispers, 18 inches; watch heard, left ear, on contact; C-2 fork, air conduction, eighteen seconds, bone conduction, fifteen seconds, whispers, 12 inches.

Course.—September 5: The patient could hear a watch at 2 inches, with either ear; C-2 fork, right ear, air conduction, twenty seconds, bone conduction, fifteen seconds, whispers, 24 inches; C-2 fork, left ear, air conduction, twenty-five seconds, bone conduction, fifteen seconds, whispers, 16 inches.

October 9: The patient could hear a watch at 22 inches, and whispers at 4 feet, with either ear; C-2 fork, air conduction, thirty seconds, bone conduction, fifteen seconds, with either ear.

CONCLUSIONS

All of these cases responded very readily, except Case 4, in which improvement was slight, if any. Bone conduction was practically a complete loss and this made the prognosis very poor to begin with. Case 1 was diagnosed as nerve deafness and prognosis was very poor also. However, the results were pleasing.

In determining the normal relationship between the maxilla and the mandible, I consider three factors. 1. The length of the anterior teeth plus the amount of bone absorption. 2. Division of the face into thirds, namely from the hair line to a line drawn through the center of the eyebrows (this, of course, cannot be considered in bald-headed men); from this point to the anterior nares, and from the anterior nares to the symphisis. 3. Determination of the retrusion of the condyle heads by placing the little fingers in the external auditory canals, using the thumbs as a rest on the forehead, and asking the patient to open and close. The sense of touch can be educated to assist one greatly. I also find that very often the measurement will be the same from pupil of eye to pupil. This measurement, in 60 per cent of the cases, is 2½ inches.

The distance that had to be increased between the maxilla and the mandible in order to accomplish results, varied from 4 to 14 mm.

I am indebted to Dr. Decker, who made the ear examinations before and after dental treatment. Previous to the recording of our observations, Dr. Decker, stated that, while he had never considered such possibilities, he was very pessimistic as to the results to be expected. He is enthusiastic over the results obtained.

I wish also to acknowledge my debt of gratitude to Dr. Monson of St. Paul, Minn., Dr. Wright, of Pittsburgh, Pa., and Dr. Prentiss of Iowa City, Iowa, for the information covering this subject.

SOME CHANGES IN THE TISSUES OF MONKEYS FROM MALNUTRITION

By FRANCIS LOWELL BURNETT, M.D., Boston, Massachusetts

ON account of the immense amount of study carried on at the present time on the effects of deficient and badly proportioned diets on animals, the pathology of heretofore vague conditions of the human body is becoming more and more clearly defined. A decade ago, little did anyone realize that changes could be produced in the structure of the bone in growing animals that would result in the irregular formation and decay of the teeth. But now, on account of the extensive researches of Percy R. Howe, Mrs. Mellanby and Zilva and Wells, these abnormal alterations in the formation and structure of bone can be readily produced.

The changes that have taken place in the jaws and teeth of monkeys fed on deficient diets Dr. Howe has already reported on. These changes are only a small part of structural defects and alterations in the tissues of these malnourished animals. In this study, sixteen complete postmortem examinations and a few special examinations have been made. The outstanding feature of this work, as would be expected from the kind of food given to animals, has been changes in the osseous system. Many of the animals showed an enlargement of the epiphyseal ends of the long bones. Such a change was frequently evident at the costocartilaginous juncture, which showed well marked grooves on the outside of the chest and a distinct beading within. In a similar way, many of the tibiae showed a marked bulging of the proximal end; and in a microscopic examination of these tissues, the line of demarcation between the centers of ossification was very broad and indefinite, and similar to the lesions described in rickets. In a few of these animals, the amount of bone produced was markedly deficient. This condition was manifested by a thinning of the cortex and a delicate formation of the trabeculae of the long bones. The result of this decalcification was several spontaneous fractures of these bones. In one of the animals, there was inflammation of the marrow, an osteomyelitis. The inflammatory process eroded the cortex of the bone and produced an abscess beneath one of the muscles. The muscles of some of these animals were atrophied and flaccid, but this condition may in part be due to disuse.

Besides the skeletal system, lesions were also apparent in some of the other organs and tissues of the body. The gastro-intestinal tract generally showed a thinning of the wall of the intestines. This phase of malnutrition was manifested microscopically in an atrophy of the mucosa and a diminution in the thickness of the muscle layer. Ulcers were not apparent. Lesions of the liver or pancreas could not be found. The lungs occasionally showed areas of consolidation, pneumonia, which was evi-

dently due to a terminal infection of the animal in a weakened condition. Changes in the circulatory system were not marked. A few of the animals had enlargement of the heart and an excess of fluid in the precordial cavity; but in a microscopic examination of the muscle, the tissue did not appear abnormal. The excess of fluid in this cavity was evidently due to the condition of the blood, as it frequently showed a severe anemia. One animal during life had a hemoglobin of only 48 per cent (Haldane's scale); and, in a few of the others, there was a marked change in the size and shape of the corpuscles, with many nucleated cells apparent. The spleen and thymus, when evident, did not show any special changes. In only one monkey was a lesion of the kidney apparent. This was manifested by a slight increase of the interstitial tissue with a diminution in the size of the glomeruli, a condition comparable with an early nephritis. Two of the animals had convulsive attacks which were called tetany; and one lost the use of the hind legs through paralysis; but on examination of the nerve tissue of the cord at necropsy, lesions could not be found. A few of the animals developed general tuberculosis, in which organisms were isolated from some of the lesions, and one or two others showed a multiple infection with abscess formation, from which an organism could not be obtained. In these cases, too, the lesions produced were not typical of tuberculosis. On this account, one must suspect the condition due to a tropical parasite or organism which is not well known.

CONCLUSION

It is evident that when young monkeys (*Macaca rhesus*) are given an incomplete diet, not only are changes produced in the structure and resistance of the osseous system, which is evidently the cause of irregular and carious teeth; but this form of malnutrition also may lead to an atrophy of the intestine, a lowered resistance of the lungs, anemia and disorders of the urinary and nervous systems.

PRELIMINARY REPORT OF PRENATAL CLINIC

By A. N. CREADICK, M.D., and JEWELL M. GOMPERTZ, M.D.,
New Haven, Connecticut

(Read before American Academy of Periodontology, Cleveland, Ohio, Sept. 7-8, 1923)

RECENT developments in preventive dentistry have pointed along lines related to the general health of the individual. At the prenatal clinic of Yale University School of Medicine, we have attempted to observe what effect thorough oral hygiene might have on those disorders of the general health peculiar to the period of gestation.

PRELIMINARY REPORT

About 50 per cent of all pregnant women suffer from nausea and vomiting especially during the first few months of gestation. This may be moderate in degree, represented by the so-called "morning sickness." On the other hand, it may necessitate isolation and hospital care. In several forms, called pernicious

vomiting, the pregnancy may require termination prematurely to save the life of the mother.

Intensive study of the occasional severe form of pernicious vomiting has led obstetricians to believe the condition due to a toxemia, which is manifested in its final form by liver and kidney damage. No chemical or laboratory test is yet available to differentiate the moderate, curable case from the severest type, in its earliest manifestations. Certainly, minor, apparently extraneous causes may aggravate vomiting. Notably, gastrointestinal disorders, uterine malpositions and lesions may cause, and their removal cure, severe vomiting. It is unwise, therefore, to place too great emphasis on any one causative factor; nor can one etiology be claimed for all cases of vomiting. However, it has been apparent that since we have routinely applied prophylactic dental hygiene to expectant mothers, especially early in pregnancy, the incidence of vomiting in all degrees has lessened.

"For every child a tooth" is an old saying, and recent studies of calcium metabolism make it apparent that there is a great change in the calcium storage of the mother during gestation and an increased output of calcium during lactation. This variation in calcium is represented in the mother's teeth and alveolar ridges.

It has been customary in the past for the better class of patients to submit to routine examination of their teeth as soon as pregnancy is suspected. Various physicians have permitted a more or less severe treatment of carious teeth, but we feel that the elimination of possible foci of infection, with attendant toxemia, has not been enforced on such patients.

We have studied a series of cases in our outpatient clinic (600) and likewise a smaller group of private patients during the past year. It has been remarked that there has been no case of vomiting except of the very mildest degree arise on our service, with one exception. In that case, the patient developed a gallbladder infection, which was responsible for the nausea. Knowing full well that it is easy to confuse "subsequence for consequence," we are not making any didactic inference in regard to the etiologic relation between a diseased mouth and pernicious vomiting. It is only too certain that factors that aggravate vomiting have been accused of causing the symptoms.

Without making, therefore, any arbitrary statement, we feel called on to report a small series of cases in which distinct relief of an aggravating symptom has been accomplished by placing the mouth in a sanitary condition.

GLEANINGS FROM DENTAL HISTORY

By KAETHE W. DEWEY, Chicago, Illinois

THE care of the teeth and the high value placed on good and beautiful teeth by any particular race or people are not necessarily a measure of the height of their civilization; for we find both a matter of concern to some so-called savage peoples. Nor can we claim that certain diseases of the teeth, such as caries and periodontoclasia, which actually become more manifest as civilizations reach higher levels, are obviously the penalties of the luxuries of civilized life, or even are an expression of the decadence of civilizations, for we find these diseases in some primitive peoples and they existed in prehistoric times in men and in animals.

Care of the teeth has not been and is not now a question of prophylaxis and of hygiene only. An interest in cosmetics always has played a conspicuous part. Beautiful teeth are an adornment; they add to one's attractiveness; they are a recommendation of the possessor. But what are beautiful teeth? Can their natural beauty not be enhanced? Does the natural appearance of our hair satisfy our sense of beauty? Are not the natural tendencies of the hair whimsically corrected according to the prevailing fashion and conceptions of beauty of the day, of the race? If straight, the hair is curled, and if kinked, it is made straight; it is ruffled or pasted down, braided, twisted, bobbed, shingled, amplified, replaced and adorned in multitudinous fashions to vie with the lavish ornaments we see on the heads of birds. Why not add to the natural beauty of our teeth? It seems this is also a matter of taste, and *de gustibus non disputandum.* There are some peoples and tribes in various parts of the world who practice peculiar alterations of the teeth that appear to us as atrocious mutilations and disfigurement, but to them apparently are an improvement, an adornment.

With some tribes of East Africa, it is customary to have the upper central incisors of young people made peg-shaped; in another tribe all the upper incisors are filed down to a point on either side. This is also practiced among the Eskimos, the Indians of North America and certain tribes of South America, and on the island of Java and in Australia. When the incisors of both the upper and the lower jaw are filed off to pegs, a mouth like a shark's is produced; or the mouth of a beast is imitated by chipping off all the upper and lower incisors. Sometimes also the two upper first bicuspids are chipped off, so that the lower pointed cuspids project like the fangs of a wild beast.[1] Sometimes, the lower central incisors are chipped off, when the upper central incisors are made peg-shaped. Or the upper incisors are filed so as to make spaces between all the incisors, and a wide space is produced in the lower jaw by chipping off the central incisors. Another type of mutilation consists in making one, two or even three indentations on the free edges of the incisors, so that the anterior den-

1. Sudhoff, K.: Geschichte der Zahnheilkunde, Leipzig, 1921.

ture appears like a saw. This practice is found among some African tribes. The instruments used for this purpose are a chisel, knife, hammer and saw. The polishing is done with a stone. On the island of Sumatra, tooth hammers of bone and iron chisels are used. Mutilations of teeth, such as filing off and indenting the incising edges, were also widely practiced in early American civilizations.

Among some of the Java tribes, the teeth are dyed black with powders containing iron or copper salts.

Besides this rather brutal method of beautifying the teeth, there is the custom of adorning the teeth with gold and jewels, a practice which also implies harsh inflictions on the teeth. In Batak, it is the custom for men to bore holes through the teeth and fill them with gold and silver wire, supposedly in order to produce a better enunciation. In India, particularly, women adorn their teeth with gold, and not rarely the teeth are also dyed red, while the men put golden buttons on their teeth. In southern India, this habit is especially popular. These gold and silver ornaments either project as small buttons or are on a level with the surface of the teeth. Hindu men also wear gold ornaments between the two upper central incisors. The outer portion of the teeth is also taken off and the surface bedecked with diamonds and other jewels. Sudhoff and Struck,[2] who describe these peculiar customs, state that it is astonishing that so little is heard of dental disease and dental operations among these peoples, although it is evident that the enamel layer of the teeth is so often and so greatly injured and often even destroyed. However, there is some kind of treatment by African practitioners for this beautifying mutilation of the teeth; in some parts of Africa, the person who has had some of his teeth chipped off is given the juice of a certain fruit or the infusion of the leaves of a certain tree "so that the teeth may become firm again."

Such practices of mutilating the teeth for embellishment were unknown in ancient Egypt and in ancient Nubia, as the examination of 20,000 Egyptian skulls has shown. They first appear at the time of the Ptolemies. Sudhoff emphasizes the fact that there is absolutely no truth in the statements about gold-filled teeth or teeth made of wood or iron, or of ebony replacements of teeth among the ancient Egyptians. Most conscientious examinations of thousands of dentures from Egyptian tombs and dentures of mummies have failed to show even a trace of dental work. Metal platelets have occasionally been found in the mouths of mummies, and this has given rise to the statements mentioned above, but the truth is that such platelets served as covering of the faces and had simply become displaced.

That a good denture was highly valued among the ancient Babylonians is shown by a law passed in 2,000 B. C. which contains two paragraphs referable to the teeth. "If anybody knocks out the teeth of one of his equals, his teeth are to be knocked out" (a law equivalent to the Old Testament saying: "An eye for an eye, a tooth for a tooth." "If he knocks out the teeth of a freed man, he is to pay one-half a mine of silver." In another paragraph of the same law, however, we read: "If anybody destroys the eye of a freed man or breaks the bone of a freed man, he is to pay one mine of silver." Hence, the loss of some teeth was estimated at half as much as the loss of an eye.

As to the care of teeth among some of the so-called savage peoples, a statement of Struck is illustrative: "It is known that the natives of Africa have better teeth than most Europeans, but it is often overlooked that they owe their

2. Struck, B.: Zahntherapeutisches von den Eingeborenen Afrikas, München, med. Wchnschr. 1906, p. 53: 1921.

beautiful teeth less to Nature or the kind of food they live on than to such excellent care of their teeth that many an African could be a model for Europeans."

In East Africa, many native tribes have the habit of cleansing their teeth thoroughly early in the morning with a tooth stick which is fringed out at one end like a broom. It has been observed that throughout the East African territories where this cleansing of the teeth with this toothbrush or toothbroom is practiced, the "savages" have excellent teeth; while in South Africa, where this habit is unknown, the teeth of the natives are in a pitiful condition. The broomlike fringing of the wooden stick is preferably produced by chewing one end of the stick. Such sticks are also used by other peoples. The natives of New Guinea use toothbrushes made of wood with brass wire. For oral and dental hygienic purposes, peoples of the island of Java chew the betel nut, arecanut and tobacco; in other wild races, the chewing of other leaves and balsam is in use for this purpose.

As to the effective use of the toothbrush in Africa, Struck suggests that it is not entirely impossible that the particular kind of wood that is used for toothbrushes may have some effect on the teeth, and also the fruits with which the gum tissue and the teeth are dyed in some parts of Africa may have some beneficial qualities.

In many peoples and in animals, the teeth are kept mechanically clean by proper chewing of the proper food—hard, raw food, which necessitates thorough chewing. The thick incrustations of tartar found on the teeth of the ancient Egyptians are sufficient evidence, as Ruffer[3] states, that the Copts did not clean their teeth at all, and from the slight attrition that these teeth exhibit, one may judge that they lived chiefly on cooked, soft food that was chewed without an effort. The princesses of ancient Egypt, however, took good care of their teeth, as the tombs of princesses of the time of the twelfth dynasty (2130 to 1930 B. C.) show. No dental defects were found. In Alexandria, at the present time, the poorer class of natives take little care of the teeth and periodontitis and periodontoclasia are exceedingly common among them.

Dental caries and periodontoclasia belong to the oldest diseases that have inflicted mankind, and they have been found in animals far back in the paleozoic age, more than 12,000,000 years ago. Sudhoff asks: "If osteoarthritis was a severe infliction of early mankind, as it seems to be ascertained, is it plausible to believe that it stopped at the joints of the jaws and left the jaws and dentures entirely uninjured?" In a general way, one may say, the farther back we trace, the healthier the teeth are found to be. Nielsen found 14 per cent of skulls of the Danish stone age with carious teeth, while today dental caries in Copenhagen is found in more than 93 per cent of the people. Magitot found in cave skulls in France only from 1 to 1.2 per cent of dentures with carious teeth, and Schwerz found caries in 15 per cent of 7,000 teeth from skulls of the early Christian era in Switzerland. Among the Egyptians of antiquity, caries was a great rarity, but where it occurred, it was frightful in its sequelae and produced conditions of the alveoli and the jaws such as seldom occur nowadays in the most neglected mouths. Caries became more prevalent at the time of the Ptolemies. At the time of the Byzantines, it was as prevalent as it is today. It was therefore during the predynastic period, when people lived very simply and ate raw, coarse food, that caries was extremely rare. This, however, holds true only of the common people. At the opening up of large aristocratic ceme-

3. Ruffer, A.: Studies in Paleopathology in Egypt, J. Pathol. and Bacteriol., 1913, pp. 14, 18, 149.

teries at the Gizeh pyramid, 500 skeletons of aristocrats were found, in which there was evidence that caries and periodontoclasia were very prevalent at the time the pyramid was built.

From paleontologists, we learn that the early cave bears of Europe and many fossil vertebrates show disease of the teeth and alveoli. The evidence of dental caries is especially clear in the American mastodon. Renault found four types of fossil bacteria in the fragments of scales, in eburnean plates and teeth, which are analogous to those which produce dental caries. Dental disturbances and rheumatism were present among cretaceous animals millions of years ago. Caries in domestic and menagerie animals has been long recognized. According to Magitot and Miller, it is much more violent in the domestic dog than in human races. There are only a few undoubted cases of caries in wild living animals, according to Moodie.[4] This author refers to a statement by Miller concerning an interesting observation found in Brehm's "Tiehleben," namely, that the manatees (aquatic, herbivorous mammals), after a time of rich feeding, consisting of plants, go to sleep in a stream with the snout out of water. Miller states that during this sleep fermentation of the food remnants begins. He gives the characteristic picture of a section made by him of a carious Manatus tooth, showing pictures of some bacteria in the carious tissue. Moodie adds to this statement: "That caries also occurs in wild living animals is not surprising according to the dominant conception of the existence of this disease." Some of the factors in decalcification of the teeth can affect the free living animals just as well as the domestic animals and human beings, and bacteria that cause the dissolvent process of necrosis, find their way into the mouth of an animal just as easily as into the mouth of a person.

4. Moodie, R. L.: Paleopathology, Urbana, 1923.

The oldest treatment of toothache from caries seems to be with narcotics, in particular by inhalation of the vapors from the seeds of hyocyamus. This is still practiced in the Orient and, according to reports, even in parts of Europe. Offele reports the practice in Hamburg. This treatment demonstrates the "worms" and it is this circumstance that explains the curious fact that the conception of toothworms has survived through thousands of years. The procedure is as follows: A few pieces of glowing charcoal are put in a saucer and the seeds of hyocyamus placed upon them. Hot water from a cup is quickly poured over this and the whole covered with the same cup. After a few minutes, the cup is taken off. Hot water is quickly poured into it; the hands are placed between the cup and the mouth in a sort of funnel, and the worm-killing vapors are inhaled. The toothache may or may not disappear, but at any rate the worms that caused the caries are killed and are seen swimming on the water in the cup as small white worms with a black head and curled up in the form of the letter C. Now, since the toothworms are plainly visible on the water and have left the tooth, the pain will surely cease.

So much for the patient; but how can the matter be explained to us? The cup in which the hot water was kept ready to be poured over the glowing charcoal is still moist on the inside as it is turned over on the saucer and the oily resinous vapors which rise from the glowing charcoal with the drug are absorbed by the moisture on the wall of the cup. At the same time the seeds of the hyocyamus, under the influence of the heat and moisture, begin to germinate. Those seeds lying directly on the coal are roasted, but the next layer undergoes this process of germination. The germs burst their shells, are expelled and cling to the sticky wall of the cup. They are not seen as the cup is taken off, nor when

the hot water is poured into it, but during the inhalation they become detached and swim on the surface of the water. These little germs form white threads, at the end of which the dark shell of the seed is still attached. Hyocyamus yields more worms in the fall and in winter than in spring or summer; the fresher and the stronger the seeds, the greater the number of worms driven out. There is the report of eighteen worms in one case. The drug was used for toothache in antiquity and in the Middle Ages, and it is still being used; it was called *herba dentaria* in later Latin times.

In ancient times, magic rites were associated with the driving out of the toothworms with hyocyamus; for, as all diseases, toothache was believed to be the work of evil spirits which had to be expelled. A formula for conjuring the demon was recited three times over the prepared drug, which was then applied. Such a formula for conjuring the toothworm is still preserved in a Babylonian writing in the British Museum in London. In order to be sure of getting the worm, the formula included the text of the whole legend of the creation of the worm by the god Anu and his installation into the dental pulp through the god Ea. The text is as follows:

When god Anu created the heavens, the heavens created the earth, the earth created the rivers, the rivers created the canals, the canals created the mud, the mud created the worm. The worm went along; at the sight of the sun it wept. His tears came before the face of the god Ea: "What do you give me for food, what do you give me for drink?

"I give you the wood MA which is ripe, and the granate of the tree Chaschchuru.

"What is that to me: rotten wood MA and granate of the tree Chaschchuru? Let me settle down in the interior of the tooth and give me its flesh for my lodging. From the tooth I will suck its blood and from its flesh I will break its roots.

"Because you have said this, worm, god Ea may strike you with the strength of the hands."

This is the conjuring for the pain from the tooth. With the formula, this prescription was given: "Thou shalt pulverize the seeds of hyocyamus and knead them with mastich. Thou shalt say the conjuration three times over this and then put it into the upper part of his tooth."[1]

Such was then the treatment: some fetishistic rites and some remedy to be applied and for the rest watchful waiting on the part of the surgeon or physician, especially in Babylonia. For there was a law in Babylonia dating from 2000 B. C. that could all but paralyze any surgical initiative. A paragraph in this law reads as follows: "If a physician causes anybody a serious wound with the surgical knife and kills the patient, or opens up a cavity (near the eye) with the operating knife and the eye is destroyed, his hands are to be chopped off." In the treatment of an abscess, especially beneath the gingivae, where life did not become endangered by waiting, this was the natural course taken by the physician whose own life was threatened by such a Draconian law as the one mentioned above.

THE LENOX HILL HOSPITAL PLAN FOR DENTAL CARE OF HOSPITAL PATIENTS

By SIGMUND W. A. FRANKEN,* D.D.S., New York City

THREE or four years ago, the Lenox Hill Hospital decided to inaugurate proper dental care for its inpatients. Consultation with the United Hospital Fund of New York for a feasible plan elicited meager results. To-wit: A few hospitals had dental clinics in the dispensary; Bellevue and the allied hospitals had dental interns, and two or three of all the remaining hospitals had started something of the same service. The plans, boiled down with a differing of minor details, amounted to this: The dispensary departments were expanded and took on a dental intern or extern, who was to divide his time between the dispensary and the wards. In one of the institutions, there were several of these hybrid positions where the dentists were paid. In another hospital, the attending chief of the dispensary was called a dental specialist, whatever that may mean, and became head of the whole department. Other hospitals had volunteer part-time workers. In one, there were two paid prophylacticians, assisted by volunteer students. All in all, there was no clean cut workable arrangement that, with modifications, could be employed in any general hospital.

In a report[1] issued subsequently—in June, 1924—by the United Hospital Fund of New York, which surveyed the Dental Community Service in New York City during the summer of 1923, the chaotic condition of dental service, not only in hospitals but in the entire community, was plainly set forth. Quite a detailed description of one of the plans was given—the one in force at the Presbyterian Hospital. The Lenox Hill plan was not put into execution until Sept. 1, 1923, and therefore was not included in the report.

The Presbyterian plan was originally started with an appropriation of $10,000, with yearly additions promised, and provides for six paid dentists and two hygienists. Any hospital financially fortunate enough to begin a service with such an appropriation available is in an enviable position. Even in a city as large as New York, there are very few institutions that can commence with so elaborate a program. Including the Presbyterian Hospital and the Bellevue with its allied hospitals, Mr. Davis, in the report, states that there were but twelve dental interns in the hospitals of the entire city during the summer of 1923. Taking for granted that even the most skeptical admit the necessity of some kind of dental care of inpatients, this report shows beyond doubt that it is mainly a financial consideration that prohibits the installation of a proper dental service in all the hospitals.

However, to return to the time of the attempt to get information (1921-1922) from the Hospital Committee of New York: In personal communication with

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1. "Community Dental Service in New York City," a survey of dental clinics and other organized facilities by the Committee on Dispensary Development of the United Hospital Fund of New York.

the officer designated as being most conversant with this phase, I found that about the only information available was the fact that a few hospitals had, or were going to have, a vague kind of service, but of details as to the duties, etc., there was a complete lack. Nevertheless, I was relieved to get the names of the hospitals having some form of dental service. On investigating the plans of these institutions, I found the various difficulties encountered in the execution of them not discoverable in the yearly reports, but only by a personal canvass of as many of the hospitals as possible. I was not interested so much in how the machine worked when on parade, as in how its routine really functioned. Very often, plans that have been laboriously developed in advance change materially when put into execution. In an investigation of the hospitals within reach during 1922, obvious faults were found and many points in need of improvement were discernible.

One had a visiting extern who was supposed to take care of ward patients. After looking at the very meager equipment, I inquired as to the hours for working. No dentist being present, the nurse showing the office said, "Oh, about twice a week when he has time." This seemed rather hard for a suffering patient. At other institutions, it was said that bedside work is being done when asked for by a physician. Still another institution had the dental interns take and develop their own roentgenograms. Another examined only the mouths of all admitted children, and permitted the adults to develop toothaches before giving them attention. One of the hospitals had different attending dentists, daily, who did all the interesting work.

The Lenox Hill Plan

These are only a few of the hit and miss attitudes readily discernible at the few hospitals that are attempting dental care. To rectify these and other drawbacks, the Lenox Hill plan has been developed and is herewith submitted. It has been in successful operation for more than a year, and thus far has elicited much satisfaction.

The requisite was to find an inexpensive method, susceptible of expansion as the service demanded and as funds were assured. The following will be seen to cover the field as well as be within the budget of any modern hospital.

First and foremost, there is a distinct separation between inpatient and outpatient services. This is most important and as necessary as separating the surgical services in similar situations. The hospital and dispensary naturally have a close common bond, namely, the patient; but the services should be and are separate.

The next point in importance is the installation of a fully equipped dental room as near the main operating rooms as possible, with a dental intern for the exclusive service of inpatients. He is on the same footing as the medical intern, with service for one year.

Just as medical interns in good institutions are first put to work in minor positions, and only gradually are permitted responsibilities, so it was decided to change the accepted custom of immediately permitting the dental graduate to work in the wards. Therefore, to meet this obvious defect, the Lenox Hill plan has provided a period of intensive practical training, under constant supervision, at the dispensary for the new dental intern. At the termination of this period of intensive work, his active duties in the hospital commence, and his separation from the dispensary is complete.

Before the duties of the dental intern are mentioned, it will be clearer to continue the outline of the Lenox Hill plan.

An attending dentist visits the hospital several times weekly to make rounds and be on call for consultation with the other departments. He also does any work, surgical or otherwise, for which the intern has not been trained.

The dental intern is responsible to the attending dentist, who, in turn, is responsible to the hospital for the dental department.

A prophylactic nurse, who is really an extern and is paid, aids the intern, especially in clearing up septic gingivitis. She does all the cleaning of teeth, and later assists in charting the mouths.

Before the duties of the dental intern are adverted to, it is well to consider that he gives a year of his time, during which period he should learn as much as possible. Watching the attending dentist operate is good experience for his eyes, but, really to derive benefit, he must do the various operations himself. Also his time should be so regulated that opportunity can be given him to augment his knowledge in the allied branches of medicine and surgery, and so equip himself to be a better dentist and more capable of carrying on his profession after the termination of his internship. But to continue with the Lenox Hill plan:

Within twenty-four hours after the admission of a new patient to the wards, he draws up a chart. This chart is very important and is on every patient's history record. It has the distinctive color green so that the attending physician or surgeon can immediately read the points in which he is mainly interested—such as the presence or absence of septic teeth, abscesses and pyorrhea. Under the heading, oral examination, there are lines for the date, name, systemic diagnosis, condition of the soft tissues, and remarks. In the center of the chart are four sets of cross lines. Here are chartered, as explained below, the teeth that: (1) are missing; (2) have cavities; (3) are to be extracted, or (4) need crowns and bridges. These charts become part and parcel of the patient's record, and any dental work performed is recorded at the bottom under "remarks." A duplicate record of work executed for the patient is kept by the intern, but it was only a waste of time to have duplicate charts. Therefore, he simply makes an entry in an ordinary blank book with the date, the patient's name, ward, journal and history number, and, of course, the work performed.

For charting the teeth, the intern uses the system of dividing the mouth into quarters—two upper and two lower, and the median line to redivide these two divisions. Commencing at the median line, the teeth are numbered from one to eight. The numbers correspond to the patient's teeth as though the mouth were open and the patient being faced by the dentist.

Much stress is laid on the early, or rather immediate, examination of the new patients. In most hospitals this is often neglected, and the dentist—intern or extern—or the dispensary men work on the ward patients only when called by a physician. Frequently, physicians pay little heed to the teeth until the patient complains of pain, and it is to avoid this situation that immediate charting of all patients' mouths is insisted on. Patients acutely ill—whether needing medical or surgical attention—are not to have any work performed; all others, with the knowledge and consent of the attending physician, are cleared of septic oral conditions. As much of this work is done in the dental room as possible, all other at the bedside or main operating room, under general narcosis if necessary.

The pediatric division is considered an integral part of the hospital, and therefore receives proper dental care. The charts are made as for the adult patients. Necessary extractions are done under either local or general anesthesia. When under general narcosis, the dental room is not used, but instead one of the surgical amphitheaters with medical attendance.

All cavities are filled with an antiseptic cement and the teeth cleaned, besides which each child receives a toothbrush.

At the beginning of each month, the dental intern submits a signed report as

to work done during the preceding month. The report is divided into two parts, one for adults and one for children, and includes:

Examinations.

Work performed; extractions; prophylaxis; scaling; fillings (amalgam, cement, gutta percha).

Treatments.

Fractures.

Miscellaneous.

It has developed that merely clearing out the mouth helps in varying degrees; that many ward patients neither have owned nor have ever used a toothbrush, and that merely teaching oral hygiene is insufficient. Each patient receives a toothbrush and is required to use it. The head ward nurse sees to this distribution, at the time of the patient's admittance or as soon thereafter as possible.

No mention has been made as to the use of the roentgen ray. This is done by the roentgen-ray department whenever it is desired or deemed necessary. It is as unnecessary to make roentgenograms of the mouth of every newly admitted patient, whether adult or juvenile, as it is to take a gastric series for all patients admitted to the medical service.

The field covered by the dental department includes all necessary extraction, temporary fillings and minor oral surgery. By minor oral surgery is meant dental cysts, fractures, granulomas, etc., but not malignant or suspicious growths or any other nondental condition. Fillings are only of a temporary nature, sufficient to stop or ease pain. No plates, bridges or artificial restorations are made. A working arrangement with the social service department is arrived at to cover cost of material and mechanics' fees when splints are necessary.

Results

This summary covers the plan at the Lenox Hill Hospital. No mention has been made of the months of rounds and futile attempts at having the ward patients treated by the dispensary men. That was the original thought, but it never worked satisfactorily; patients sometimes had to wait from two to five days before one of the dispensary men could take time to run over. All this has been overcome by the present system. It is so constructed that expansion, when necessary, is easily accomplished by the simple expedient of adding an intern, a nurse or an attending dentist. As a matter of fact, to get the plan working, we started with but an attending dentist and an intern. The intern took over the cleanings that the nurse would have done, but we hope to get an early appropriation for a dental hygienist.

Conclusion

The Lenox Hill plan for dental service includes the entire hospital. There is a distinct and separate division for the outpatients, organized as any other section of the dispensary, and an inpatient division, having full responsibility of the dental care of the ward patients. This work is supervised by an attending dentist, who is responsible to the hospital and who has an intern and a hygienist to help him carry out the work. The ease of expansion or contraction and the low cost of installation and maintenance are other reasons why the Lenox Hill plan can, and should be, more universally adopted.—*Journal of the American Medical Association.*

DEPARTMENT OF DENTAL HEALTH EDUCATION

DETROIT DENTAL CLINICS FOR CHILDREN

By A. C. THOMPSON, D.D.S., Detroit, Michigan

(Read before the American Dental Association, Dallas, Texas, November 10-14, 1924)

DETROIT was one of the first cities in the United States to establish dental inspection for school children. About twenty years ago, the first dental clinic rendering free service for poor children was established by Dr. William A. Giffen in Grace Hospital. This clinic, the establishment of which was the result of dental inspection of some of Detroit's schools, has rendered continuous service through the years.

The pioneers in this service were, in addition to Dr. Giffen, Drs. C. H. Oakman, George Burke and J. W. Bucknall; and these men were leaders in a movement that soon brought about the establishment of a dental division of the Detroit Board of Health. With a small appropriation, a central clinic was established, and a few schools were provided with dental equipment. The pioneer unit, established in Grace Hospital, was taken over by the board of health. The city employed two full-time and several part-time dentists to operate the clinics and as the necessity of some educational work was recognized at the very beginning, several dentists were employed to make inspections in the schools.

The early policy of emphasizing the educational program has been maintained and enlarged from year to year. The city has, from time to time, increased the appropriation for the service, beginning with $5,000 per annum and increasing to $50,000. Today, the service has twenty-two dental units, situated as follows: Thirteen in schools, two in hospitals, three in institutions, such as the Children's Aid Society, and four in the central clinic.

A standard dental unit consists of: (1) chair, (2) cuspidors, (3) electric engines, complete with hand piece and contraangle, (4) bracket and table, (5) wall cabinet, (6) electric sterilizer and (7) operating instruments.

A unit thus equipped costs approximately $900. The central clinic differs from the standard school or hospital clinic (for school children only) in that our equipment here is more complete. In addition to the four units comprising the operating part of the central clinic, we have provision for administration of nitrous oxid, roentgen-ray service, a special surgical equipment for special cases, such as fractures, root amputations and other out of the ordinary surgical proce-

dures, and an orthodontic department where, each year, we complete from ten to forty cases.

The necessary equipment for record maintenance, stock inventories, keeping case records and bookkeeping, and educational charts and models are also a part of the central clinic's equipment. The personnel of the dental division consists of (1) a director, who gives half time; (2) an assistant director, who devotes full time; (3) ten full-time dentists, who operate; (4) two dentists who give all their time to dental inspection and instruction; (5) two half-time dentists, who also inspect and instruct in the schools; (6) fourteen part-time dentists, including half-time operators in clinics and specialists in orthodontic and oral surgery; (7) three dental hygienists and eight assistants. This is the present staff.

The annual report for 1923-1924, operating on an appropriation of $25,000 per annum, is as follows:

Total number inspected	46,001	O. K. 5,526
Number with permanent molars lost	4,126	
Number with permanent teeth decayed	22,573	
Number O. K. except for prophylaxis	4,845	
Number with abscessed teeth	5,994	
Number with marked malocclusion	1,227	
Classroom lectures	356	
Auditorium lectures	67	
Group lectures	50	

An auditorium lecture averages 320 people, or eight classrooms, hence the total lectures in schools equal 892 classroom lectures. The group lectures were given to various groups in the waiting room of the central clinic.

We believe that the most valuable part of our work is that of inspection and instruction. School inspection includes oral examination, record of findings, notification of parents with written instruction, child's classroom record, together with a classroom lecture or, when a modern school auditorium is available, group or auditorium lectures to children. Where parent-teacher organizations are active, it also includes an afternoon lecture to this gathering on such subjects as "The General Care of the Teeth," "When Teeth Develop," "The Part Diet Plays in Tooth Development and Maintenance," "The Causes and Results of Decay," "Focal Infection," "Malocclusion," "Mouth Breathing," and "The Necessity of Proper Care."

Work done for children is more difficult than that for adults; that is, the physiologic conditions of the child's teeth, with their large pulp chambers, etc., demand greater care in the removal of decay, cavity preparation and the insertion of fillings.

The dentist who is qualified to care for little children, and who can inspire confidence and banish fear is a most valuable individual.

The inspection report shows the enormous loss of permanent teeth in school children. We know that this condition is preventable, and we are endeavoring to overcome such conditions in the first grade pupils by special care of the first permanent molars. We are depositing silver nitrate in the fissures and sulci of all the first permanent molars of the lower grade pupils when no decay is apparent, with the idea of prevention.

We wish here to refer to the clinical report. There is danger, in a busy school clinic, that the operator will get into a rut, or hurry through his work, forming habits of carelessness.

To overcome this, we have monthly meetings of the staff, at which our problems are discussed and methods of procedure outlined. The school operators attend the central clinic on Saturday morning, where a varied clinical program of amalgam restoration, root treatment, extraction or any other part of our work is in charge of the older and more experienced operators; as a result, say in the case of amalgam restorations, inserting no amalgam fillings, except in pit or fissure cavity, without a cement or nerve capping base. We do not believe that base metal should ever be in contact with vital dentin, hence the protection. Also, we are taught that amalgam should receive the same care in reproducing tooth form and as to finish as would a gold inlay or any other artificial restoration.

CLINICAL REPORT (June 30, 1923, to June 30, 1924.)

Number of patients treated	12,176
Number of repeaters	19,670
Total number of appointments kept	31,844
Number receiving prophylaxis	9,441
Amalgam fillings	12,641
Cement fillings	5,180
Guttapercha fillings	281
Roots treated and filled	99
(Treatments—386)	
Pulps capped	2,384
Silver nitrate	1,987
Permanent teeth extracted	3,118
Decidious teeth extracted	12,344
Special surgical cases (roots amputated, etc.)	388
Roentgenograms	282
Orthodontic cases	30
Completed cases	10
Number of appointments	461
Other treatments, such as odontology, after extraction treatments	1,604
City appropriation for 1923-1924	$25,000

Of unusual interest are some of the extraordinary cases that are continually present. Occasionally, it is a fractured mandible or maxilla; more frequently, an abscessed anterior permanent tooth.

Frequently a child is found with, say, the upper right central incisor nonvital, with a fistula. Our method of procedure is to open the pulp chamber, treat and sterilize, and fill the root canal. The method employed in so doing is the one advocated by the Detroit Clinic Club (pulpless tooth section). After the root canal has been filled, and within forty-eight hours, we amputate the apical portion, curetting the bone about the apex and polishing the root end, depositing metallic silver thereon. I realize that there is nothing out of the ordinary in this procedure, except for the class of cases in which it is employed. The roentgen-ray examination of the general cases reveals regeneration of bone about the root ends, the firmness of the tooth in its socket, and the healthy appearance of the surrounding tissue; and so warrants us in believing that this is a valuable procedure.

The curettement of the diseased area is the correct surgical procedure and the results could not be obtained by treatment alone.

What has been outlined up to the present has summarized in a general way the activities of the dental division of the Board of Health. Cooperating with this division is every other department that has to do with child welfare, the school nurses, school physicians, infant welfare, tuberculosis, etc. The school teachers and principals are also important factors in preventive dentistry for school children. These various factors have put

in operation a plan of general physical examination of school children by the teachers. Each teacher has been instructed as to how to make the physical examination and is provided with an outline of how to proceed. These instructions have been prepared by those in charge of various divisions. For instance, the dental division submitted an outline of procedure for detection of oral defects. In all cases, the standard of marking is the same. The findings are indicated as follows:

Teeth: o represents a normal condition; x, slight defects, slight uncleanliness, pit cavities in deciduous teeth; 2x, any cavities in permanent teeth, heavy stains, badly broken down deciduous teeth—any defect in the permanent teeth; 3x, urgent conditions in either permanent or deciduous teeth, evidences of pus, etc.

The same scale of marking is used in marking for anemia, abnormality of thyroid or tonsils, mouth-breathing, enlargement of cervical glands, orthopedic defects, or defects of the eyes, ears, heart or lungs.

On a checkup by physicians, it was found that these instructed teachers missed about 19 per cent of physical defects, not including those of heart and lungs. The dental examinations were only very general. Dental reexamination showed that the teacher's examination was somewhat over 19 per cent in error, but in the main it was a success and resulted in corrections to many more children.

In the report of the experimental work done last year in Detroit, the department indicated that of all children with definite cardiac involvement, 23 per cent had teeth marked 3x, or urgent, and of all children (in a group of 5,000) having serious dental defects, 55 per cent had cardiac involvement. Twenty-six per cent with tuberculosis had bad teeth, which shows that defective teeth bear a definite relation to heart and lung infections. Twenty-five per cent of all children with anemia had defective teeth (3x), and 10 per cent of all with 3x teeth were anemic. Out of the 5,000 examined, only 2.5 per cent had adequate dental care.

CONCLUSION

We are enthusiastic over the prospects for increased service made possible by a more liberal appropriation for the present year. We recognize that most of the terrible conditions found among our school children are preventable, and that a program of education of the public is imperative. As a result of our efforts in the past we find schools in the poorer districts, where dental service is rendered, may be changed from a record of 90 per cent defective oral conditions to 54 per cent (Bishop School).

We also note that during the past seven years the number of dentists devoting their time exclusively to children has increased 500 per cent. We do not know how much increase in dental service rendered to children has been accomplished by the general practitioners; we know it has been very great, and that the demand is increasing.

It is gratifying to see the American Dental Association recognizing more fully the need of prevention where it counts for something—"Prevented Dentistry."

DISCUSSION

E. L. Pettibone, Cleveland, Ohio: There is just one thing in which the Cleveland

clinics disagree with Dr. Thompson. We don't believe that he should treat any deciduous teeth wherein there is a pulp involvement. I am sure that time will convince Dr. Thompson that it is not good practice, especially in school clinics, to treat or attempt to treat a deciduous tooth in which there is a pulp involvement.

Dr. Thompson (closing): I did not mean to imply that we treated any deciduous teeth in our clinic. We do not. The reference I made was to permanent teeth in which destruction of the pulp was indicated. We do not treat deciduous teeth so far as treating disease conditions or anything of that sort is concerned.

DENTISTRY AS A PUBLIC HEALTH ACTIVITY

By FRED J. CONBOY,* D.D.S., Toronto, Canada

(Read before the Eastern Ontario Dental Association, Stanley Island, June, 1925)

HEALTH is not a new subject. The history of the healing art dates back to the creation of man. Necessity, instinct and chance taught man curative practices just as it taught him to prepare his food and to provide for the other wants of life. The dissection of animals in their sacrificial offering to the Deity and their use as food taught him the anatomy and physiology of the lower animals, and this knowledge, applied to man, with the addition of that gained from actual cases of sickness or injury and from embalming, led to the development of primitive medicine.

Nor was this primitive treatment confined to individual and personal effort alone. The ancient records prove that there were also public or community health activities. Herodotus, the ancient historian, states that the Babylonians used to carry the sick into the public squares. The passerby was supposed to inquire regarding the malady from which the patient suffered, and if he had heard of a similar case, he was to suggest the means used to accomplish a cure. The isolation of lepers and others suffering from contagious diseases, who were not allowed to mingle with the people in the cities, proves that the ancients had a knowledge of quarantine. It is not my intention to give you a detailed history of the great public health movement, but merely to bring to your attention the fact that health and disease has concerned the minds of the world from the dawn of civilization. Not only have the medical and allied professions been interested; this subject has inspired noted authors and statesmen, some of whose writings have had an important influence on the public conception of health, not only for their day and generation but also for all time.

Why shoulds't thou die before thy time?
—Eccl. VII-17.

Good health and good sense are two of life's greatest blessings.
—Publius Syrius.

The public health is the foundation upon which reposes the happiness of the people and the strength of the Nation. The care of the public health is the first duty of a Statesman.
—Disraeli.

There is no kind of an achievement equal to perfect health.
—Roosevelt.

*Director of Dental Services, Ontario.

The most distressing thing about sickness lies in the fact that is unnecessary. Most diseases are preventable, and yet, on any given day, three persons out of every hundred are sick. Today, in Canada, there are 240,000 people who, because of ill health, are unable to carry on efficiently. If preventive measures already proved in practice could be made available in every community, a reduction of from 10 to 25 per cent in casual illness could be accomplished, and thousands and thousands of lives could be so prolonged that many years of valuable service would be rendered to the state. The supreme need in this province is health education. The general public must be taught that disease can be prevented, and must be instructed in the best way to develop and maintain physical well-being. The department of health is alive to the need of advancing health interests, and thereby the happiness and comfort of the people of Ontario; but it cannot function efficiently without the support and cooperation of the citizens, and it is in the securing of this team work and in the dissemination of useful health information that physicians, dentists, nurses and social workers can be of such great assistance.

The work of public health education brings us face to face with the age-old question. What must we do in order that we may continue to live? Nature's answer to this inquiry is definite, clear and emphatic. If we desire to continue our existence, we must provide for ourselves nutrition and protection. The human race has always been confronted with these essential requirements. Primitive man was forced to venture forth from his cave to get food, but in thus going forth he always risked his life. He did not always return home, but sometimes stayed out permanently in order to furnish a meal for a wolf, tiger, python or alligator. In these days, man must likewise venture forth from his home to secure food, not by direct hunt, capture and slaughter as in former days, but by earning the wherewithal to buy his household needs, and in this daily grind he encounters certain germs which attack him no less fatally and just as truly eat him as ever wolf or tiger ate his ancient forefathers. Ninety per cent of our diseases are due to our luckless situation in constituting the favorite food for certain germs. Our popularity as host places us in an unenviable position. During the great war, 14,000 Canadians were killed each year in battle. During the same period, 100,000 Canadians were killed each year by germs.

We must protect ourselves. But how are we to do it? There are a number of ways, and the first to be mentioned is that of cure. What marvelous advancement has been made in recent years in the methods of treating people suffering from the various diseases! And this progress is in a large measure due to the scientific experimental work carried on in our laboratories. These beneficial results show themselves in both surgery and medicine. In olden days, the vast majority of patients operated on died of blood poisoning. Today, nearly all recover. A few decades ago, almost all diphtheria patients died. Today, 5 per cent is a high figure.

But cures consist in repairing damage already done; and we have a better form of protection, consisting in preparing our bodies against disease and thus establishing what is termed immunity. Every person possesses a certain resistance and is able to wage a more or less effective battle against an invading

organism; but, in many cases, this resistance can be so increased that the foe has no opportunity to make a successful attack. Immunization or the protection of the human body against disease has reached its highest perfection in smallpox through the process called vaccination, and no matter what our personal opinions may be in regard to the advisability of using this method, it must be admitted by all that vaccination will render an individual immune to the attacks of this dread disease. The same will soon be true in regard to other ailments, and immunization is sure to become an effective method of combating disease.

Nevertheless, its application is limited, and it has serious disadvantages, and so we turn to a consideration of the third method of protection, namely, evasion, which simply means keeping away from infection, avoiding people who are sick and adopting such a routine in life that exposure to disease will be reduced to a minimum. How important it is to emphasize the necessity for such a course of action! How often we take unnecessary risks and place ourselves at the mercy of an army of hostile germs!

Then, as a final effort, society should endeavor to abolish disease. But you say that is an absolute impossibility. We have had sickness from the beginning of the world and we will have it to the end. And yet leprosy and yellow fever have been abolished, typhoid fever has been reduced by more than 80 per cent in Ontario, while tuberculosis has been decreased by 31 per cent. The future is hopeful. With our scientific advancement, our powers of organization, our education and our wealth, we should be able to overcome many diseases and thus prevent much pain, poverty and sorrow.

In fighting the battle against sickness and disease, the important factor is to secure satisfactory adjustments between the individual and his surroundings. This may be accomplished in two ways: first, by so building up and developing the power of resistance in the human body that it will be able to withstand all the onslaughts made on it by external forces whether they are extremes of temperature, germs, or any other enemy to the physical being; and, secondly, by so modifying the surroundings that the individual will not be subjected to serious attack; that is, by correcting those conditions which expose a person to danger.

Dentistry is chiefly concerned with the first method; that is, the prevention of disease by the removal of physical defects and by developing and maintaining a high resistance to invading organisms. Dental diseases are not only harmful and painful disorders in themselves, but they also lead to and are the causes of secondary lesions that have very serious results. The modern dentist not only corrects a troublesome dental defect but also plays an important part in general preventive medicine. Dr. Charles Mayo said, "The next step in medical progress in preventive medicine should be made by the dentist." Sir William Osler is responsible for the statement that there is not one single thing in preventive medicine that equals mouth hygiene and the preservation of the teeth.

In a recent address, Dr. W. J. Bell, deputy minister of health for Ontario, referred to the dental branch of the department of public health and said that dentistry had now come to be recognized as a major factor in public health. He stated that recent researches

in medicine, and particularly in the field of focal infection, had disclosed the fact that septic foci in the mouth had been the cause of an astonishingly large proportion of illness. Dr. Bell strongly emphasized the health protection and disease prevention aspect of dentistry and cheered the profession by expressing in behalf of the minister and the department of health, a hearty welcome for the profession of dentistry in the public health field.

Every intelligent citizen recognizes the fact that bad mouth conditions are detrimental to the physical well-being, but he does not understand how the micro-organisms and toxins get into the system. Bacteria or germs are always present in the human mouth, but when the teeth have been neglected and show large cavities, the number of bacteria is greatly increased. Dr. Weston Price states that, while the normal mouth might show a count of about 10,000,000, the one with extensive decay will give a count of about 500,000,000. A large number of these germs belong to the disease-producing varieties, and whether they remain in the mouth, pass into the lungs or are swallowed with the food, they are always a menace to the health of the individual. Those that remain in the mouth are ever ready to attack their victim the minute the resistance is lowered; while those that are swallowed with the food may cause serious inflammations in the lining of the alimentary canal.

The condition of the neglected mouth is alarming. With the millions of bacteria, the pus from abscess, fistulas and pyorrhea pockets, decayed tooth substance and decomposed food, the individual becomes a menace to public health. These mouths frequently harbor the germs that cause infectious diseases and are a rampant source of contagion. The proper care of the mouth will greatly reduce the prevalence of contagious diseases. This contention has been disputed by some health authorities; but it has been abundantly proved by actual tests, and ordinary observation demonstrates that the presence of these bacteria must be a menace, or sanitation is a delusion and sterilization a waste of time and effort.

The most outstanding cause of ill health as far as dental conditions are concerned is to be found in focal infection, the bacteria and toxins from abscessed areas and pyorrhea pockets entering the circulation and being carried to some other part of the body, where a secondary lesion is started.

There seems to be no escape from the conclusion that many of the degenerative diseases that appear to be on the increase have as one of their important and, in many cases, their chief causative factor, dental infections. It is probably seldom the case that dental infection is the only contributing factor, but when we take into consideration the fact that the great majority of adults are carrying seriously infected teeth potentially capable of producing degenerative diseases if the local and systemic quarantine breaks down, we must come to the conclusion that this condition is one that merits serious consideration. It has been well established that the strains of organisms that are found in the great majority of heart, kidney, joint and muscle and nerve lesions can also be recognized in the dental foci. We are therefore justified in coming to the conclusion that the proper treatment of the dental abscess and pyorrhea pockets will do much to improve the general health.

It is quite unnecessary for me to urge the importance of proper mastication.

From the standpoint of digestion as well as of preventive dentistry, thorough chewing of the food is essential. The adequate mastication of coarse, fibrous foods provides natural cleansing for the teeth and the stimulation that will keep the gums in a healthy condition. The exercise of the parts causes a healthy blood supply, which provides for tissue repair and development. When children are unable to chew the food properly because of sore teeth, they develop the habit of bolting, which remains with them throughout adult life, often causing indigestion, malnutrition and lessened resistance to disease.

The unerupted or impacted tooth presents a problem that demands attention. Locked in its bony enclosure, ever trying to come into proper position and obstructed by another tooth, it exerts a pressure that causes serious nervous disorders. Many indefinitely located pains are caused by these teeth; and in some cases patients suffering from mental diseases have shown wonderful improvement after removal of impacted teeth.

I do not need to stress the danger of allowing sharp edges of teeth or old roots to irritate the tissues of the mouth. We all know that many tumors, including those that are malignant, have been caused by such irritation. Dr. Joseph Colt Bloodgood, of Johns Hopkins University, has made the statement that "cancer of the mouth will be a thing of the past when the public understands and acts on thorough mouth hygiene."

The acute abscess and the neuralgia resulting from an exposed pulp need no emphasis. The pain and distress are so marked that the sufferer demands immediate attention. Unfortunately, the general public is not aware of the fact that it is the chronic abscess (which causes no discomfort) that is most dangerous. A tooth may be serviceable and free from pain, and yet have an area of infection at the root end that is a distinct menace to health; and the size of the area of rarefaction is not the important consideration: a small area in one patient will do far more harm than a large one in a patient with better resistance. Some people can carry a large amount of focal infection. They have a strong resistance and they are taking care of themselves in other ways; but that is no guarantee that another person can safely take the same chances or that the same individual can continue to withstand the infection indefinitely. Some overload in the form of a mild illness, overwork or worry may present itself, and the enemy will then have an opportunity to make a successful attack. Safety lies only in the removal of dental infection.

It would be entirely useless to prove that dental diseases cause systemic disorders without setting forth some procedure that will adequately provide protection against the existing conditions and so I desire to present a public dental health program which we feel will prove efficient. Such a program must include the following activities:

1. Regular inspection and proper treatment. The teeth must be examined regularly once every six months and the proper treatment given. Thus, the cavities will be discovered and filled while small. This prevents pulp involvement, which leads to many long and expensive root canal treatments, and it also secures a better and more nearly permanent result, with the minimum of pain, loss of tooth tissue and expense. A tooth properly treated when decay is in its incipient stages retains a live healthy pulp and will not develop a root end abscess.

The early indications of periodontitis

will be noted and the causes of this dread disease, which occasions the loss of so many teeth, will be removed. Pernicious habits that lead to dental irregularity and facial deformity will be detected and corrected, and treatment for irregularity will be begun early in life, when the best results can be achieved.

2. The second activity is to educate the general public so that the people will realize the importance of a properly balanced diet. Diet is, of course, largely an individual matter; but we are convinced that a smaller consumption of carbohydrate food, usually taken in the form of confectionery and candy, and a large consumption of fruit and vegetables, especially raw vegetables, would be very helpful from a dental standpoint.

3. The third consideration is the proper and sufficient mastication of food. Few people know how to chew their food. They are expert in many ways of little importance, but they are wofully crude in this health essential. Not only does thorough mastication aid digestion, but also the chewing of coarse fibrous food acts as a natural tooth cleanser and gives the parts that exercise which will ensure a healthy blood supply.

4. The fourth requisite is artificial cleansing or the mouth toilet. It is most important that the people form good health habits, and there is no practice more helpful than regular tooth brushing, which cleans the teeth and so aids in eliminating the cause of decay and guards against periodontitis by removing irritants and stimulating the gum tissue.

5. The last essential includes pleasant living conditions, plenty of sleep, regular hours, recreation, exercise and play in the open air and sunshine.

How is this program to be carried to the people?

1. By school dental services maintained by the municipalities.

It is entirely unnecessary for me to point out to you the advantages of a school dental service as far as it influences the physical well-being of the children, but there may be some who have not given much thought to the relationship of such a service to the mental and moral development.

Dental diseases are frequently the cause of mental retardation, and the school board that does not provide for the physical welfare of the children is not getting good value for the money spent on education.

The state recognizes its responsibility in educational matters. It provides the necessary advantages and insists on attendance at school. But the physical is of as great importance as the mental, and as the state accepts its obligation in one case, how can it evade its responsibility in the other? The state forces the child to attend school, but does not protect the child from contracting disease while at school.

Since the days of Juvenal, educators have been quoting that much abused phrase "a sound mind in a sound body," and while they have made diligent provision for schools in which sound minds could be developed, they have felt that these schools needed little scrutiny as to their fitness for conserving and developing sound bodies. They have failed to recognize that the true aim and function of the school is to make healthy, happy and successful citizens. Those children receive the best education who are best prepared to take up the active duties of life when school days are over, and to fill successfully their places in

society. The vast majority of children come into the world with healthy bodies, and it is the duty of the school to see that their health is protected and their physical powers are developed. Most boys and girls are mentally normal, and, if properly trained, will develop into men and women of ability. Potentialities for good exist in every child and these latent moral feelings, when fostered, lead to reliability and an exemplary character.

A school program can be worked out that will give the child an opportunity to develop all his God-given powers and faculties; and a school dental service will play an important part in that system. If a child is to take full advantage of his educational facilities, he must not be handicapped by physical defects.

All knowledge is gained through the senses. Through the five main windows of sight, hearing, touch, taste and smell, the child looks out on the surrounding world and gathers in sensations, images and concepts, which are developed into mental material. What a great catastrophe if these sense organs are diseased or defective, and in consequence the knowledge gained through them is not correct! All psychologists and psychiatrists agree that thought is dependent on the body. When the brain is poisoned or diseased, when the nerves are weak or the internal glands function poorly, intellectual development is interfered with. All these conditions may be caused to a greater or less extent by toxins that enter the blood stream from abscess areas and pyorrhea pockets. Then, again, if a child is to make educational progress he must concentrate on his work; and how can he center his attention on study if suffering pain or weakened by dental disease? I will not take time to deal with the loss of opportunity caused by absence from school or of the extra burden thus placed on the teacher, but will content myself by quoting the opinions of some of our prominent educators on this subject.

J. A. Taylor, B.A., public school inspector, City of St. Thomas and District No. 2, Elgin states: "It is found that the great majority of children who suffer from physical disability are from one to five years behind other children of their age in their studies."

Dr. Luther H. Gulick, of New York, is responsible for the statement that, of 40,000 children examined, those with two or more bad teeth averaged five months behind the grade they should occupy. Observations made in connection with the Toronto schools bear out this contention.

A test made in Cleveland demonstrated a 60 per cent increase in efficiency after proper dental treatment.

Wallis, of London, England, who was one of the original investigators of the condition of children's mouths, says: "Those with the most highly septic mouths were frequently two standards below what they ought to be in accordance with their age."

The old saying that if a pupil is to make the best use of his educational advantages he must have a sound mind in a sound body, is just as true today as it ever was. It is a psychologic impossibility to reach the maximum of intellectual efficiency unless the mind has a sound body through which to function. True, there are examples in history of great minds operating in weak bodies, but it is also true that these minds would have been still better had they had strong bodies through which to work.

An efficient dental service means better moral health. The physical, mental and moral are intimately and closely

related. That which injures one, to a certain extent weakens the others. Endurance, ability and reliability go hand in hand. A pupil physically weak is handicapped in his intellectual development, and a pupil mentally weak is handicapped in his character building.

The great requisite for character development is right thinking. The pupil who continuously suffers pain and is handicapped by physical defects has thoughts that are morose, gloomy and sullen, and these have a destructive influence on his character.

It is the child who through some physical or mental defect finds it impossible to hold his own in the class room that becomes the truant. He soon begins to realize that he is a failure and to feel that the school authorities are oppressing and persecuting him, that everybody's hand is against him, and the moral disease of unreliability soon manifests itself because the person weakened by disease is weak in will power and more readily yields to temptation.

Judge Lindsay, the great authority on juvenile delinquency, insists that every boy who appears in his court have his teeth properly treated so that he will be free from pain and infection and be able to masticate his food properly. He realizes that the removal of a physical defect is often the first step in character-building.

A modern school dental service should provide for the children of preschool age. Every child should be placed under the care of the dentist when 2 years of age. The deciduous or first teeth must be preserved. They serve the child during the period of greatest development and when lost or diseased, growth is hindred. Many child ailments are caused by infection from diseased roots and inflamed gums and conditions thus developed often continue throughout adult life.

For the purpose of bringing to the attention of the proper authorities and the general public the value of a school dental service, we are organizing a province-wide dental survey. The dentists are giving their time gratuitously for this initial dental examination, and the department is supplying the necessary material so that the inspection can be conducted entirely without cost to the municipality.

Such a survey has many advantages. Notification cards showing the condition of the children's mouths are sent to the parents, and a large proportion provide the necessary treatment. Local statistics are tabulated and thus give the authorities an accurate idea of the extent of the problem and the cost of its solution. The examination creates a general interest in health matters, and causes the people to consider more seriously their responsibility to the children and their duty to themselves. This survey can be obtained by any municipality in the province.

The second method by which we hope to carry the advantages of dental treatment to the people is through the hospital dental department. There are thousands of people who need dental attention but cannot afford to have the work done. Dentistry is not a luxury: it is an absolute necessity. Yet as it is at present organized, to pay the necessary fees is for many people an impossibility. Something must be done and the hospital department provides one solution. Wherever the hospital authorities are willing to provide the equipment and supplies, the members of the profession will give their time gratuitously to man the clinic. The Western Hospital, Toronto, is now operating a three chair dental clinic in a most suc-

cessful manner, and it is confidently expected that many others in the larger centers will take advantage of this efficient form of service.

The third activity is the industrial or factory clinic. This form of dental service is very popular in some parts of the United States and should prove most successful here. During the last hundred years, we have been busy perfecting the inanimate machine. During the next hundred years, our time will be occupied in perfecting the human machine. Every factory employe loses on an average eight days each year through sickness and many times that number of days through inefficiency caused by defects and infection. We all know how factories are organized for effective work. The machines are kept in perfect order, oiled and cleaned, and every part adjusted. How important it is then that the man who runs the machine should also be efficient. Moreover, it appears to be rather foolish to spend much time and money on a school service to remove defects and teach the children good health habits and then to neglect them entirely when they reach adult life.

The fourth consideration has to do with the problem of a dental service in all parts of the province. There are some districts in which the people are able to pay for dental treatment, but they are far removed from a resident dentist and they hesitate to spend their time and money traveling to and from the nearest large center. For many such communities, the itinerant dentist and the traveling clinic are the only solution and a number of these services are now being organized.

CONCLUSION

I should like to point out here the absolute need for more aggressive health education. Tradition and customs prevent professional men from measuring up to their full responsibility in this regard. Many conscientious dentists feel that they are doing their full duty when they give advice and treatment to those who seek it, and that professional ethics will not permit them to go farther. What is ethics? Is it not, in the final analysis, the exemplification of the golden rule? Would these men be satisfied if their neighbor had some information which would protect them from great injury and loss and he withheld it simply because he was not absolutely sure that his advice would be welcomed? Dentists have knowledge that the people need; consequently, they are in duty bound to impart that knowledge, and the highest ethics will not permit them to take any other course. But how should this useful information be disseminated? The most efficient agent is the public press. There has unfortunately in recent years been a misunderstanding between some professions and some newspapers due to confusion of thought between health education and advertising. Newspaper men have made the statement that physicians and dentists, in their public health education, were seeking cheap advertising, and the professional men in turn charged the newspapers with encouraging advertising that was not in accordance with ethical practice. This situation is regrettable and should be corrected. There is all the difference in the world between health education and advertising. One js altruistic and benevolent, the other is usually self-seeking and mercenary. One has as its activating motive the betterment of humanity, the other, personal gain. The healing professions and the newspapers both owe it to the general public to join hands and by mutual cooperation bring to the

people that knowledge which will protect them from preventable diseases and, perchance, premature death. With this object in view, the dental department has prepared several hundred short, readable newspaper articles which will be sent to any paper that will provide the necessary space. Motion pictures, slides, posters and pamphlets are also available, and members of the profession in all parts of the province should be willing to give public addresses pointing out the means whereby an individual can protect himself from the ravages of dental disease.

I am glad to have this opportunity to speak to the dentists of Eastern Ontario. We are all engaged in an altruistic endeavor to protect the citizens of this province from disease and injury. Health is most important, from both the standpoint of the individual and that of the state. The task of preserving health and preventing disease is so gigantic that it challenges our best efforts and calls for many personal sacrifices; but the results will more than justify the time and energy expended.

Dentistry has much to offer that will benefit the citizens of Ontario, and the people look to us for leadership in connection with this new public health movement. To some it is given to read history; to a few it is given to teach history; to us it is given to make history. May we be willing to accept our opportunities and measure up to our responsibilities so that in after years it cannot be said that we were remiss in our duty. Our activities will differ to some extent, but we will all be engaged in a work which will never become monotonous, for new avenues of helpful service will ever open before us and we can always look back on a past of useful work well done.

COMMUNITY DENTAL SERVICE AS DEMONSTRATED AT CHILDREN'S DENTAL CLINIC, COOK COUNTY HOSPITAL, CHICAGO

By M. H. KILLIP,* D.D.S., Chicago, Illinois

MUCH has been said and written concerning the development of dental education in Chicago and Cook County, but little does the profession at large realize the great responsibility and untiring effort that has been produced by members of the Public Service Committee of the Chicago Dental Society in developing this dental health program.

For many years, this work has been carried on by a few loyal dentists and a number of laymen, who gave their time and money in order that the poor children of our city might secure free dental service. Realizing that this could not be the solution of a community problem, this committee called on public officials to aid them in establishing a free dental clinic.

After a number of conferences and much effort on the part of a few men connected with the committee, an ap-

*Dental Supervisor.

propriation for a clinic was made by the Cook County Board of Commissioners. It was also decided that such a clinic, financed by public fund and run as a county institution, should be connected with the county hospital. A building was found suitable for the clinic, and in the fall of 1923, Cook County's first free dental clinic was opened to the public.

Fig. 1.—Cook County Children's Dental Clinic, Cook County Hospital.

The budget passed by the county commissioners for the first year was approximately $40,000 and each year the board has voted a new budget of $25,000. The general running expenses for the year are taken out of the general hospital budget. By being connected with a large institution such as the county hospital, a clinic of this type can secure many advantages, and operate with less expense than if it were run as a private institution.

The clinic is equipped with the latest and best furnishings that can be secured. It consists of a large receiving room, examination room, a main operating clinic with eight complete units and specially built children's chairs, sterilizing room, retiring room, play room, operators' and nurses' quarters, and offices. More equipment will be added to the main operating clinic as soon as a larger appropriation is made.

In order to take care of those children who are most deserving, and to eliminate all those who are able to pay for their work, a representative of the County Agent department examines each case before the child is admitted as a patient. If there is any doubt as to

the circumstances of the family, an investigator is sent to the home and a report is made before further action is taken.

Only a limited number of patients can be taken each month and many are refused treatment or are sent to other clinics or dispensaries for treatment. There are four sources by which children are admitted to the clinic; namely, the County Health Department, County Agent, Juvenile Court, and the County Hospital. The County Health Department brings children from the rural districts. Their nurses have certain days assigned each week and the children brought by them are given preference on those days. The County Agent admits children from the city who are brought by either parent or the nurse, those sent by the board of education, and those from other dispensaries. The Juvenile Court sends many of the mother's pension cases and the boys from the Cook County school located at Riverside.

Fig. 2.—Section of Main Operating Clinic, Cook County Dental Clinic.

The operating staff is composed of graduate licensed dentists. Each operator is a full time civil service employee and is first recommended by the Public Service Committee to the Civil Service Commission. There is no limited service for the operators, but they must adapt themselves to children's work and devote their entire time to the clinic. A registered supervising nurse is in charge of that department, and is under the direct supervision of the Illinois training school.

An educational program is carried on from the time the child is admitted as a patient until the work has been completed. Each operator handles the patients assigned to him as though he were conducting a private practice. Toothbrush drills are started as soon as the child becomes acquainted, and health talks are given as the work proceeds. The children are given appointment cards and urged to keep their appointments and be there on time. It is suprising to note how quickly these children, many of them coming alone after the first time, learn to carry out the routine and how few fail to keep their appointments.

When a patient's work has been completed, he is given a card with instructions to return in three months for reexamination. If at the end of three months he returns and there is no further work needed, another card is given with instructions to return in six months. In this way, the clinic keeps in touch with the patient for about a year from the time he is first examined. About 70 per cent of the children return for reexamination after three months, and about 60 per cent return after the six months' period. In this way it is hoped to so train the child that when he is dismissed from the clinic, he will realize the necessity of visiting a dentist at regular periods.

Fig. 3.—Toothbrush drill, Cook County Dental Clinic.

An average of about 300 new patients are admitted each month and over 200 return for reexamination. We are at present taking care of between 1,800 and 1,900 appointments each month. The purpose of this clinic is not to care for a quantity of patients, but to pro-

duce quality of work in the number handled. Each operation is done with as much care and skill as is possible. All fillings are properly contoured, carved and polished. A great number of treatments are made in both permanent and deciduous teeth, and they are carried out under the most septic conditions and followed by the use of roentgen rays. Each operator works with the idea of giving the patient the best service possible.

The question of preventive dentistry has often arisen wherever we have demonstrated our clinic. With the condition of the mouths that are presented to us, it is hard to accomplish much in the way of preventive dentistry. It often is hard for us to do reparative dentistry successfully. Unless a tooth is hopeless or injurious to the health of the patient, we try to save it, even if for only a short time.

SCHOOL DENTIST EMPLOYED IN DALLAS

The school board of Dallas, Texas, has recently made an appropriation which allows for the employment of a dentist to work in the schools. He is to survey all of the schools, do emergency work and instruct the twenty-seven physical education teachers as to the fundamentals of dental health and methods of followup in order that they, in turn, may carry the message to the student body. In addition to giving lectures, the dentist will see that teachers and lay people are supplied with pamphlets and other material on dental health.

FLORIDA LICENSES DENTAL HYGIENISTS

Florida has recently passed a law licensing dental hygienists. This makes a list of twenty-seven states in which the hygienist is licensed to practice. Hawaii also licenses dental hygienists.

APPOINTMENT OF DENTAL INTERN

The Riley Hospital, Indianapolis, Indiana, has recently appointed Dr. Starz H. Grau as dental intern on the same basis as the medical intern.

FIELD NOTES*

Dr. Mary H. Westfall has been appointed state chairman of the Oral Hygiene Committee of the Indiana State Dental Association. Dr. Sherman Davis, professor of chemistry at Indiana University, during August and September lectured on oral hygiene at the various county teachers' institutes. In this way, about 8,000 teachers received instruction on the fundamentals of dental health.

Ninety-seven girls, representing sixty-nine counties in Indiana, attended the home economic school held in conjunction with the state fair. The girls received two weeks' instruction in the various phases of homemaking and in matters of health. The health work was under the direction of Dr. Ada E. Schweitzer, director of the Child Hygiene Division of the Indiana State Board of Health.

*The Department of Dental Health Education will be glad to receive items of news along the lines of education in dental or general health.

The Journal of the American Dental Association

58 East Washington Street, Chicago, Illinois.

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Editorial

WE ARE ALL HUMAN

To watch the trend of our professional activities would sustain the argument that we are all very human. And sometimes this tendency does not work for the welfare of our patients in all particulars. It is hardly going too far to say that the members of the profession generally lack balance and perspective. A man comes to town and we take a postgraduate course from him—all of which is very laudable. The argument is that no practitioner should permit himself to get in a rut and fail to take advantage of every advance made in the science and art of dentistry. But what is usually the result of this postgraduate work? If a man is level headed and discriminating, nothing but good comes from it, but most of us are not discriminating, and the result is that our perspective is sadly warped by what we have learned. Henceforth, every procedure of practice is colored and formed by the theories taught in the postgraduate course. If the instruction was on partial dentures, then every case that comes to our office where any natural teeth are left will, perforce, in our mind call for a partial denture. Even if all the teeth are left except one, our mental strabismus will twist the situation into one calling for a partial denture. It is in our blood, and we can see nothing else—otherwise, what did we take the course for? If we have been taught fixed bridgework this case, and all others, lend themselves unreservedly to a fixed bridge; if it was removable bridgework we studied, then all fixed bridgework is anathema in our eyes, and every case calls for removable bridgework. If perchance we took a course in full denture con-

struction, our patients would better beware if they chance to have a few good natural teeth remaining. From that blessed day when we saw the light concerning full denture work, every natural tooth straightway becomes an enemy of mankind, and must be eliminated to save the race and to conform to our newly acquired point of view. If we have paid our money for a course in local anesthesia, our fingers at once begin to itch to push a hypodermic needle into the tissues of our patient and we find numerous indications for its use which before had never occurred to us—or to our patients. If we witness a demonstration of the so-called "surgical removal of teeth" or a curettement of a socket, or the amputation of the apical end of a root by a white-gowned operator, we are instantly impressed by it and want it to do it ourselves. It is spectacular, and it lends itself so readily to our imagination that we are not content till we have tried it—tried it on the unsuspecting and terrified patient. If we buy a roentgen-ray machine and proudly install it in our office, that very moment every case that comes in calls insistently for a picture—the great marvel to us is that the patient has ever lived up to that time without having pictures made of the teeth. If perchance we have taken a course in pyorrhea work, straightway every patient suddenly develops that dreadful malady—there is not a chance in a thousand that the simplest case of gingivitis is not construed into an old, far gone, chronic condition which calls for the most expert and expensive course of treatment, much to the consternation of the patient. If it was porcelain jacket crown-work that intrigued us, all else is as naught compared with that, and every old stump of a molar is laboriously built up to receive a porcelain jacket. It matters not that the more simple, practical and permanent restoration would have been the ordinary gold-shell crown; the fever is in our system and we abhor everything except the porcelain jacket crown.

And so it goes to an endless train of perverted and even pernicious conceptions which work to the serious disadvantage of your patients. Not that every one of these methods of practice has not a place under its legitimate indications; not that

postgraduate work is not in every way praiseworthy and even necessary; but our human limitations do not permit us to be sufficiently broadminded to grasp the good and eschew the evil, in other words, to accept a sane point of view and to judge unerringly as to what is best and what is not. And the pathetic thing is that owing to our serious lack of discrimination our patients are subjected to untold injury and imposition, which should never be with a profession of supposedly intelligent and honorable men and women.

Let us pray for discrimination. C. N. JOHNSON.

WILLIAM WALLACE WALKER, D.D.S., M.D.S.

1855-1925

William Wallace Walker, of New York City, past president of the American Dental Association (1891-1892), died, June 14, 1925, at Saratoga Springs, N. Y., of pneumonia, in his seventy-first year.

Dr. Walker was born in Rochester, N. Y., in the year 1855. He graduated from the Baltimore College of Dental Surgery in 1884. For many years he had taken an active and prominent part in the activities of his profession, holding at various periods the offices of president of the New York State Dental Society, the First District Dental Society of New York City and the Odontological Society of New York, as well as the office of president of the national organization. He was curator of the First District Dental Society at the time of his death. He acted as chairman of the executive committee of the World's Columbian Dental Congress in Chicago in 1893 and was a delegate to the International Dental Congress held in Paris in 1900. He held the honorary degree of M.D.S., from the New York State University and was a fellow of the New Jersey Institute of Dental Science. Dr. Walker was prominent in Masonry and was a lover of outdoor life and athletics; held membership in the Racquet and Tennis, New York Yacht, New York Athletic and Hudson River Country Clubs. Mrs. Walker, formerly Miss Ethel Hornick, survives. Burial was at Sioux City, Iowa.

HARRY B. TILESTON, D.D.S.

1860-1925

Harry B. Tileston, Sr., dean of the University of Louisville School of Dentistry, died suddenly of heart disease, Aug. 30, 1925, at his home, 2132 Cherokee Parkway, Louisville, Ky. He had apparently been in good health and was at his office the afternoon before his death.

Dr. Tileston was born in 1860, at Evansville, Ind., where he received his early education. He was graduated from the University of Michigan College of Dental Surgery in 1882, and after a few months' practice in Owensboro, Ky., came to Louisville, where he had since resided. He had been a teacher in the University of Louisville School of Dentistry since 1887, having taught operative dentistry and pathology until he was made dean of the dental school in 1918. He had been a member of the Kentucky State Dental Society since 1885, acting as president in 1891. From 1893 to 1896, he was a member of the state board of dental examiners. He also was president at one time of the Jefferson County Dental Society, the National Association of College Faculties and the National Dental College Teachers' Association. He served as honorary president of the International Dental

Congress at San Francisco in 1915, and was vice president of the American Dental Association in 1916-1917.

In addition to his professional activities, he was interested in the work of the Young Men's Christian Association, having served for years as chairman of the central committee.

HARRY B. TILESTON, D.D.S., Louisville, Ky.
1860-1925

He was a member of the Warren Memorial Presbyterian Church, a Mason and a member of the Filson and Audubon Country Clubs.

Surviving are the widow, Mrs. Fannie Elizabeth Tileston, and three sons, Drs. Harry B., Jr., and Leroy Tileston, of Louisville, and Edward Tileston, of Los Angeles. Burial was in Cave Hill Cemetery, Louisville.

Medical and Dental News

California

Officers of Southern California Dental Society: The following have been elected as officers of the Southern California Dental Society: president, A. H. Gilbert, San Diego; president elect, J. Walter Gray, Los Angeles; secretary, James W. Carson, Los Angeles; treasurer, C. C. Noble, Los Angeles; editor, Bert Boyd, Los Angeles.

Illinois

Dental Examinations at State Fairs: The Illinois State Dental Society has had charge of the work of examining the mouths of the children entered in the Better Babies conferences at ten of the state fairs.

School Attendance a Medical Problem: Diseased teeth and toothache resulted in 687 absences or 1,030 lost days during two school years at Hagerstown. Out of 5,981 school children in thirty-four schools of sixteen different counties in Illinois, who were examined by staff members of the state department of public health, 2,553 or 42 per cent had defective teeth.—*Illinois Health News*, August, 1925.

Health Work Among Syracuse School Children: For children whose parents cannot afford such service elsewhere two dental clinics are conducted in the Syracuse schools. Two dentists employed by the board of education devote five hours each school day to this work. In addition, three dental hygienists employed from demonstration funds, clean and chart the teeth of the children; counsel parents regarding the correction of dental defects noted and instruct the pupils individually and in groups on the importance of the care of the teeth. Of the 10,066 children referred to the dental hygienists during the year, the teeth of 3,584 were charted and those of 1,882 were cleaned. Dental attention was recommended for 2,273 pupils. Educational talks were made to classes in 1,913 instances.—*J. C. Palmer, in Illinois Health News*, August, 1925.

Chicago Dental Society Meets: At the first meeting of the season, September 15, Dr. Arthur B. Crane spoke to the Chicago Dental Society on "Root Canal Fillings." At a dinner preceding the meeting, 300 members and guests were present. Dr. M. M. Prinz, president of the society, outlined plans and policies for the coming year; Dr. C. N. Johnson, president of the American Dental Association, spoke on the coming Louisville session, and Dr. H. E. Phillips, chairman of the state committee on hygiene and public instruction, outlined the program of the Illinois Medical and Dental societies for statewide health education.

Heroic Death of Dental Student: Percy Victor Bacon, of Chicago, junior student in dentistry at Northwestern University, was drowned, September 7, at Dunes Park, Ind., in saving the life of a woman bather. Mr. Bacon assisted the woman in keeping afloat until the life guard could reach her, then sank exhausted to his death.

Indiana

Faculty of Indiana University School of Dentistry: The board of trustees of the Indiana University on June 9, 1925, reappointed all of the members of the faculty of Indiana Dental College to their previous positions in the faculty of Indiana University School of Dentistry. Appointments are made by the board of trustees at the recommendation of the president of the university. In addition to the old faculty the following become heads of departments: Professor Moenkhaus, Department of Physiology; Professor Lyons, Department of Chemistry; Dr. Myers, Department of Anatomy, and Dr.

Moon, Department of Pathology and Bacteriology.—*Bull. Indiana State Dental Ass'n*, August, 1925.

Dental Intern for Riley Hospital: For the first time in the history of dentistry in Indiana, an intern has been appointed on the same basis as are medical interns for hospital service. Dr. Starz H. Grau began his service as dental intern at the Riley Hospital for Children on July 13, for a term of one year. His services will be under the direct supervision of the house physician, Dr. Batman, and under the advisory staff, consisting of Drs. Frank H. Hamilton, J. B. Carr and F. R. Henshaw. The dental clinic at the Riley Hospital has been in operation since the first of the year and has made a splendid impression on the authorities of the institution. It is proposed to have dental interns at the Long Hospital and the City Hospital as soon as the necessary arrangements can be completed. Such a service will be of vast benefit to these institutions and will give a year of exceptional training to those who are successful in securing the opportunity. In the future, interns will be selected by competitive standings from the senior class of Indiana University School of Dentistry.—*Bull. Indiana State Dental Ass'n*, August, 1925.

Kansas

Joint Meeting of the Golden Belt and the Northwest Districts: The fall meeting of the Golden Belt and Northwest Districts was held at Concordia, Kan., Oct. 5 and 6, 1925. The combined membership of the two Districts approximate 150. R. J. Rinehart, secretary-treasurer of the Kansas City-Western Dental College, gave a paper on, "The Present Development of Bridgework." Burney L. Wortheley of Kansas City, Mo., presented a paper on "Laboratory Problems." Thomas B. McCrum, of Kansas City, Mo., gave a paper pertaining to the care of children's teeth. In addition several local dentists gave papers and clinics.

Louisiana

Tulane Raises Requirements in Dentistry: Beginning with the fall term, a year of predental work will be required of all matriculants in Tulane University of Louisiana School of Dentistry.

Dr. Leefe Made Dean: Dr. Alfred A. Leefe, acting dean and professor of pathology and therapeutics in the Tulane University of Louisiana School of Dentistry, has been made dean.

Michigan

Michigan State Board of Dental Examiners: The following are members of the Michigan State Board of Dental Examiners: J. Cyrus Arnold, South Haven, president; E. G. Robbins, Ishpeming, vice president; James W. Lyons, Jackson, secretary; W. A. Giffen, Detroit; B. S. Sutherland, Owosso; W. H. Elliott, Detroit; James F. Spencer, Grand Rapids. Chalmers J. Lyons, D.D.Sc., Ann Arbor, is a member of the state health council.

North Carolina

Late Summer School Clinics: The school dentist of Winston-Salem, N. C., held clinics throughout the county during the month of August, under the auspices of the county health department.

North Dakota

Advisory Executives of 7th International Congress: The following have been chosen as officers of the North Dakota State Advisory Committee of the Seventh International Dental Congress: president, G. A. Rawlings, Bismarck; first vice president, R. S. Towne, Bismarck; second vice president, L. B. McLain, Jamestown; secretary-treasurer, C. A. Putney, Fargo.

Ohio

Dental Legislation: A section has been added to the law, requiring reregistration every five years.

Pennsylvania

Plans for Huge Medical Center: Plans to erect a $14,000,000 medical center at the University of Pittsburgh, to rank with the foremost in the world, are announced by the university's medical committee. Agreements have been perfected, it was stated, to include Presbyterian, Children's, Elizabeth Steel Magee, Montifiore and Eye and Ear hospitals in a group to be operated in conjunction with the university's fifty-two-story Cathedral of Learning. In connection with this centralized group, the school expects to conduct a $2,000,000 medical unit. The plan will be financed by the hospitals joining the unit, most of which have plans under way for new buildings. The five institutions will have a capacity of 1,350 beds, said to surpass the capacity of any present group and

equaled only by a similar plan of amalgamation of the Presbyterian Hospital of New York City with the Medical School of Columbia University now under way.

TEXAS

School Health Work Held Legal: The question of the legality of appointing doctors, nurses and dentists to carry on health work in public schools having been settled by a ruling of the state superintendent of public instruction, the work will be continued in the San Antonio, Texas, schools. Announcement of the proposed discontinuance of the health work brought protests from practically every school patron in the city.

Medical-Dental Building for Austin: Plans are being developed for a ten-story building which will offer accommodations for every dentist and physician in Austin, including garage in the basement and operating rooms on the top floor.

FOREIGN

British Dental Hospital: We have just received the thirteenth Annual Report of the British Dental Hospital. The official designation of the institution might convey to one who is ignorant of the facts the idea that its activities are more limited than they really are. The use of the singular case suggests one locality, and even one building only, whereas we learn from the report that there are no less than six "Treatment Centers," besides nine or ten subsidiary clinics. The hospital appears to be doing valuable work on a contributory basis; its centers being established in neighborhoods where there are large working-class populations, it is able to make good dentistry available for many who would otherwise find it difficult or even impossible to obtain it. The report states that good use is made of the opportunities presented for propaganda work on preventive lines, and it is gratifying to find, from the comparative statistics given that every year it becomes possible to increase the number of conservative operations. Between twenty and thirty dental surgeons and twelve anesthetists are actively associated in carrying out the beneficent purposes of the hospital.—*Brit. Dent. J.*, Aug. 15, 1925.

Irish Dentists and the Free State: At a recent meeting of the students of the Incorporated Dental Hospital of Ireland, a resolution was passed unanimously protesting against any legislation which will debar dental students in the Irish Free State from practising outside the State. It was decided to invite the opinion of every student in the Free State on the question.—*Dent. Surgeon*, Aug. 8, 1925.

American Dental Society Meets: The Congress of the American Dental Society in Europe, composed of dentists practising in Europe who have qualified in America, was held in private at the Hotel Cecil, London, July 28. An exhibition of the most modern dental equipment was also held and proved of much interest.—*Dent. Surgeon*, Aug. 15, 1925.

School of Dental Surgery at Cairo: The new School of Dental Surgery which has been established by the Egyptian Government at Cairo will be opened in the coming school session. We learn from the advertisement columns of the *Lancet*, for July 11, that applications are requested for the post of superintendent, with which is combined the lectureship in metallurgy. Also for lectureships in dental surgery and pathology, and dental mechanics and orthodontia. It is stated that preference will be given to candidates of Egyptian nationality. We wish this school every prosperity, and trust that it will be of great service in promoting a high standard of dental knowledge among the Egyptian people.—*Brit. Dent. J.*, Aug. 1, 1925.

Dental Clinic at English Industrial Works: It is reported that the Chloride Electric Storage Company, of Clifton Junction, has now joined the ranks of those few firms who have carried welfare work among their employes to the length of establishing a dental clinic. They have appointed a dentist and nurse to attend to their workers' teeth and have equipped them with a surgery and adjuncts of the most up-to-date kind. A small charge is made in the case of adult workers who receive dental treatment, but those under 21 are treated free of charge. All new employes are now expected to pass the dentist in addition to the Works' doctor. The company believes that the new department, besides being of great value to the workers individually, will make for increased efficiency just as all its other welfare efforts have done.—*Dent. Surgeon*, Aug. 15, 1925.

Recommendations on Oblique Advertising: The ethical committee of the British Medical Association reported at Bath its recom-

mendations on "oblique advertising." The committee recommended that practitioners of medicine who desire to discuss in the newspapers matters relating to medical science and policy and public health submit to such publication only on condition that laudatory editorial comments or headlines in the newspaper relating to the contributor's professional status shall not be permitted; that his address or photograph shall not be published and that there be no unnecessary display of his medical qualifications and appointments; it was especially emphasized that well known practitioners and those in authority observe these conditions, as their example would influence the action of their less recognized colleagues.—*J.A.M.A.*

Dr. Chiwaki Honored: Dr. Morinosuke, Chiwaki, the president of the Tokyo Dental College and the Dental Federation of Japan, was recently given the degree of Doctor of Laws by Loyola University, being one of the few Japanese ever to receive this honor from an American university. The ceremony of conferring the degree took place June 25, in the presence of 1,300 members of the profession and men of prominence in other fields. A banquet, at which there were 630 guests, was given following the ceremony. Dr. Chiwaki has contributed greatly to the development of dental science in Japan, over a period of thirty years, during which he has been the leading factor in training nearly one-half of the dentists now practicing in Japan. He formulated the first dental laws, as well as revising them at two later periods. He has written many books and articles on operative dentistry and has supervised the publication of many others. With the establishment of the Japanese Dental Association in 1903, Dr. Chiwaki accepted the chairmanship and he has been a leading factor in its development. He organized the Dental Federation of Japan, of which he is now president. This organization has contributed much to the progress of dental education and to the improvement of the oral hygiene of the Japanese. In commenting on the importance of the occasion, the *Nippon No Shikai (The Dental Journal of Japan)* says: "The conferring of an honorary degree upon Dr. Chiwaki by an American University means the strengthening of the close relationship and mutual good will between the two countries. It also attests to the international character of the reputation which Dr. Chiwaki now enjoys in dental circles. It was most fitting for an American university to recognize and honor such a personage as Dr. Chiwaki, who has for thirty years stood for American dentistry and the American ideas of dental education. During the past forty years, Japan has been learning much about dentistry from America, and has advanced greatly during that time, so much so, that all dental colleges are following the American method of dental education."

Melbourne Dental Hospital Asks Government Aid: After thirty-four years, during which the demands on its services have been steadily increasing, the Melbourne Dental Hospital has passed a resolution, through its life governors and subscribers, to ask the government for a monthly grant of £100. Every branch of the absolutely needy poor, old age and invalid pensioners, and all those referred by charitable organizations, have been cared for gratis. Many others have been cared for at a very small fee. Following is a record of some of the work of the hospital: In the past twenty years, 54,600 general anesthetics have been given. In the past three years, 26,218 patients have been examined; fillings numbered 33,089; prophylactic treatments, 3,478; extractions under general anesthetic, 9,979; under local, 6,329; dentures made, 4,250; remodelled and repaired, 3,271. In addition, fractured jaws have been set, various kinds of oral operations performed and many children have been treated for deformities of the jaws and face. In stating the claims on the Government for aid, the *Australian Journal of Dentistry* says: "Here it might be well to mention what the governments of the other states are doing. In New South Wales, the government gave land, building rent free, and a yearly grant of £250; South Australia, £25,000 from Red Cross, and the government bears the total running costs; and in New Zealand the government has recently granted £35,000 for a new building for the University of Otago; whereas in Victoria we have not had anything at all, and now that we are compelled to seek it, we surely have a reasonable claim upon our government." Further, it is stated that the only help the hospital has had, apart from that of the Australian College of Dentistry, its "foster mother" during the past four years is £1,607 received in donations.

General

The Bankers Shares Scheme: Physicians throughout the country have been circularized recently by either one concern operating under different names, or by two or more concerns that use exactly the same advertising matter. The scheme is that of offering for sale "Bankers Shares" of the Ford Motor Company of Canada, Ltd. The physician is told that, as he is the owner of a motor car, he is "hereby extended the privilege of subscribing for, not to exceed Fifty [or some other specified number] Ford Motor Company of Canada, Ltd., Bankers' Shares at $10 each. The offer, however, is sent indiscriminately to physicians whether they own motor cars or not. The "Special Subscription Privilege" blank is an imposing looking affair with an orange colored border, a serial number and a date limit. The usual get-rich-quick line of "selling patter" is used, the physician being told that those who invested in Ford of Canada in 1904 have received more than $32,000 for each $100 invested; he is told, further, that if Ford of Canada grows to be as large as Ford of the United States, the "$100 invested in Ford of Canada should then be worth more than $15,000." The officers of Ford Motor Company of Canada, Ltd., are then named, and the impression is given that this company is behind the sale of these so-called Bankers Shares. The facts are that the Ford Motor Company of Canada is not even remotely concerned in the offering of these Bankers Shares, the only outstanding stock being the capital stock of $100 a share par value, which is quoted on the open market and the various exchanges. Those operating the "Bankers Shares" scheme have, it appears, acquired a block of Ford Motor Company of Canada stock which at the present time is quoted around $490 a share. They have then divided each share up into 100 parts which they call "Bankers Shares," and offer these to the physicians of the country at $10 a "share." In other words, physicians "are extended the privilege" of paying $1,000 a share for Ford Motor Company of Canada stock when the same stock can be purchased on the open market for less than $500 a share. One of the concerns, or, if it is one concern, one of the names under which it operates, has already been restrained from doing business in New York by an injunction issued some months ago on the grounds that the scheme is one that is calculated to deceive. The rest of the country is still "easy meat." Physicians will do well to throw these "Special Subscription Privilege" blanks into their waste baskets.—*J.A.M.A.*, July 4, 1925.

A. P. H. A. To Meet in St. Louis: The Fifty-fourth Annual Meeting of the American Public Health Association will be held in St. Louis, Missouri, October 19-22, with the Hotel Statler as headquarters. This association is the professional society of sanitarians in North America, and its annual meetings always offer programs of exceptional interest to public health workers. Several special features add more than usual interest to this year's program.

The American Public Health Association, representing as it does all public health specialties, both official and non-official, brings together at its meetings and includes in its programs the various elements, personnel and subjects that go to make up our public health structure. With a view to correlating these elements, it has this year arranged for a greater number of joint sessions and general sessions than is customary.

The association's nine sections—public health administration, laboratory, sanitary engineering, food and drugs, vital satistics, industrial hygiene, child hygiene, health education and publicity, and public health nursing—will have programs of their own consisting of one or more sessions. In addition, in a number of instances two and sometimes four sections will combine to discuss in a joint meeting some outstanding development of interest to the various groups. One subject to be discussed from four angles is the epidemiology of respiratory diseases; another is oyster pollution. There will be also five general sessions participated in by the entire association. In the twenty-seven meetings arranged for, more than one hundred and twenty-five papers and reports are scheduled. These figures do not include luncheon and dinner sessions devoted to particular topics, nor a special session on mental hygiene sponsored by the National Committee on Mental Hygiene.—*Bull. California State Board of Health*, Aug. 29, 1925.

Milton Research Fund, Harvard: In accordance with the provisions of the Milton Fund for Research, Harvard University, the Harvard Corporation has made an allotment of $41,000 for 1925-1926 and one of $15,000 for 1926-1927 to defray the ex-

penses of research investigations by members of the Harvard faculty. Among the grants made from the fund is one to be used for "an investigation of the mental and physical development of school children by means of annually repeated measurements of several thousands of the same individuals from the time of entrance into school to the time of the completion of their formal education." This is the major research enterprise of the Harvard Graduate School of Education. Another grant is to assist in perfecting measuring instruments for ascertaining the natural development of normal bone growth in a child from birth to the twelfth or thirteenth year, so that the bone growth of healthy children may be compared with that of children who are abnormal.—*School and Society*, July 18, 1925.

American Electrotherapeutic Association: The presidential address at the thirty-fifth annual meeting of the American Electrotherapeutic Association, September 15-18, Chicago, will be delivered by Dr. William T. Johnson, Philadelphia, on "Factors in the Establishment of Sound Physiotherapeutic Practice." Among other speakers will be Dr. Foveau de Courmelles, Paris, France, on "Biologic Actions of Radiations;" Dr. Curran Pope, Louisville, Ky., on "Methods and Uses of the Cold Pack;" Dr. Richard Kovacs, New York, "Physical Therapy in Painful Shoulder Conditions;" Dr. Tilman Howard Plank, Chicago, "Electrocoagulation;" Dr. Harry E. Stewart, New Haven, Conn., "Placing Physiotherapy Before the General Profession;" Dr. Frank C. Balderrey, Buffalo, "Light and Some of Its Spectral Components in Therapeutics." There will be a demonstration of technic of the application of various kinds of electrical currents and phototherapy at the Drake Hotel, Thursday evening, by Drs. William B. Snow, Edward C. Titus, Fred de Kraft, Tilman Howard Plank and Richard Kovacs, and a physiotherapy clinic at Cook County Hospital (Ward 34), September 19, at 9 o'clock, at which diathermy in fractures will be demonstrated by Drs. John S. Coulter and Disraeli W. Kobak. There will be an exhibit of electrotherapeutic apparatus and accessories in the exhibit hall adjoining the assembly room. All legally licensed physicians are welcome.—*J.A.M.A.*

A Federation of Women Dentists: A Federation of American Women Dentists was organized recently with Juanita Wade of Dallas, Texas, as president, and Stella Risser of Houston, Texas, as secretary-treasurer.

Army

Army Dental Corps: Maj. Arthur J. Skillman, now under treatment at Walter Reed General Hospital, Washington, is relieved from duty at general intermediate depot, Brooklyn, N. Y., and will report at Army Dental School for duty.

Maj. Arnett P. Matthews from duty at Walter Reed General Hospital, Washington, to Washington Barracks, D. C., for duty.

Capt. Joseph L. Boyd from temporary duty at Washington Barracks, D. C., and will return to his station, Walter Reed General Hospital, Washington.

Capt. Samuel J. Rohde from station at Washington Barracks, D. C., to Camp Holabird, Md., for duty.

Capt. Clyde W. Scogin from duty at the general dispensary, Washington, to Walter Reed General Hospital, Washington, for duty.—*Army and Navy Register*, Aug. 22, 1925.

Capt. James G. Morningstar, from duty at Walter Reed General Hospital, August 10, to general dispensary for duty.—*Army and Navy Register*, Aug. 8, 1925.

The next course at the Army Dental School, Army Medical Center, Washington, will open on September 10. It will continue until the middle of February, when the graduating students will be sent to Carlisle Barracks, to the Army Field Service School, for the final course in general field training. The officers of the dental corps who will attend this year's courses, and their recent locations are: Captains Joseph L. Boyd, Ernest P. Dameron and Vivian Z. Brown, and Lieutenant Everitte F. Arnold, of Walter Reed Hospital; Captain James E. Mann, Fort Dupont, Delaware: First Lieutenant James M. Epperly, Fitzsimons General Hospital, and First Lieutenant James H. Pence, station hospital, Fort Sam Houston, Texas.—*Army and Navy Register*, Aug. 8, 1925.

Col. Frank F. Wing, from duty at Walter Reed General Hospital, Washington, about August 15, to Boston, general dispensary, for duty.

Lieut. Col. Albert R. White, to duty at Fitzsimons General Hospital, Denver, Colo., upon completion of foreign service.

Lieut. Col. George H. Cassaday, from duty at Fitzsimons General Hospital, Denver, Colo., about October 10, to Fort McPherson, Ga., for duty.

Maj. Charles DeW. Deyton, from duty at Fort Sill, Okla., to Fort Bragg, N. C., for duty.—*Army and Navy Register*, Aug. 15, 1925.

NAVY

Navy Dental Corps: Lieutenant Commander Alexander G. Lyle, recently on duty at naval training station, Newport, R. I., has been assigned to duty on board the U. S. S. California. Lieutenant Commander Lucian C. Williams, until recently in charge of the dental section of the bureau of medicine and surgery, and who lately has been on leave, was slated for assignment to the California, but he will be designated for other duty at sea in the near future. Other changes in stations and duties of officers of the Navy dental corps will be made as follows: Lieutenant Walter Rehrauer from the U. S. S. Texas to marine barracks, Paris Island, S. C.; Lieutenant Charles L. Tompkins from the U. S. S. California to navy yard, Mare Island, Calif.; Lieutenant Hugh R. Alexander from naval training station, Newport, R. I., to the U. S. S. Mercy; Lieutenant George H. Rice from naval medical school, Washington, to Naval Academy, and Lieutenant Virgil H. Traxler from naval hospital, New York, to navy yard at that place. Dr. Daniel W. Ryan, of Manchester, Iowa, has been commissioned an officer of the Navy dental corps, with the rank of lieutenant (junior grade), and he has been assigned to duty at naval training station, Hampton Roads, Va.—*Army and Navy Register*, Aug. 29, 1925.

BOOKS RECEIVED

Bacterial Infection, with Special Reference to Dental Practice. By J. L. T. Appleton, Jr., B.S., D.D.S., Professor of Microbiology and Bacteriopathology, The Thomas W. Evans Museum and Dental Institute School of Dentistry; University of Pennsylvania, Philadelphia: Lea & Febiger, 1925. Illustrated with ninety-one engravings and five colored plates. Pp. 474. Price $6.

According to the preface, this book is devised for readers desiring one or both of two things: (1) an adequate conception of infection and (2) a comprehensive understanding of the bearing of infection on the problems of dental practice. The author states: "It would be absurd to imagine that these desiderata can be realized in full merely by the study of books. Clinical and laboratory experience is necessary. But the existence of such a book as this may be justified if it facilitates the full realization and if by its very shortcomings it emphasizes the need for further investigation."

DEATHS

Cherry, Charles K., Chicago, Ill.; Chicago College of Dental Surgery, 1919; was drowned, Aug. 26, 1925, at Gary, Ind.; aged 35.

Copeland, William Lowry, Chicago, Ill.; Magill University, 1872; for thirty-five years a faculty member of the Chicago College of Dental Surgery, retiring in 1920; died suddenly, September 18; aged 75.

Gould, Myron C., Indianapolis, Ind.; Indiana University School of Dentistry, 1914; died, Aug. 11, 1925; aged 52. Burial was at Grand Rapids, Mich.

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

Necrosis of Jaws in Radium Workers: Following receipt of a report of two cases of necrosis of the jaws, one fatal, an investigation of conditions existing in the factory in which these two cases developed was carried out by Castle, Drinker and Drinker (*J. Indus. Hyg.*, August, 1925). They were able to trace five cases of chronic disease processes of the jaw bone of employes engaged in the application of luminous paint. Three who were affected died, two of whom developed a rapid progressive necrosis of the jaw following extraction of a tooth. In a fourth case, the patient was in an extremely serious condition. She had worked six and one-half years in this factory, three years after development of symptoms. Both jaws were affected. Several teeth had been lost and there was marked anemia, the patient being forced to spend much time in bed. In Case 5, the patient had a molar extracted four years after leaving the factory. Six months later, a sinus appeared at the site of extraction, and there was profuse drainage of pus. Roentgen-ray examination showed a chronic infectious process of the jaw. Chronic osteomyelitis due to phosphorus poisoning was diagnosed. The patient was later reported to have recovered. Measures for protecting the workers from exposure, as well as regular medical examination, with blood count, and systematic examination and care of the teeth, are recommended by the authors, who write: "At the time of our investigation, a considerable number of the employes required dental attention. In the case of certain workers, extraction of teeth which needed to be removed had been refused for fear of initiating a necrosis of the jaw. This introduces a most difficult question and one that needs an answer. It is unfortunately not an easy problem nor one which removal from work for a considerable period will solve; for we know that more than three years after discontinuing work with luminous paint, Miss C. [Case 5] developed a severe necrosis following the extraction of a tooth. There is, to our knowledge, no way of determining for certain which individuals may or may not have a similar experience. Our opinion is that the best way out of the difficulty lies in getting the teeth of these workers in the best shape possible, without extractions in the case of persons long exposed. After this, it is within the province only of a competent dental surgeon, who knows thoroughly the facts in the case, to decide on the removal of teeth which require this procedure. We can only suggest, in general, conservatism in the matter, and in the contemplation of the removal of a tooth the clear understanding of the possible risks by both dentist and worker." The authors, in summarizing, recall that the literature presents cases of jaw necrosis (one following tooth extraction) in patients who have received heavy treatment with radium for mouth cancers.

A New Aspect of Tooth Development: Defective teeth, like baldness and constipation, are among the abnormalities of human structure and function that the hereditary or acquired conditions of our modern civilization seem to have fostered. Hundreds of pages have been written about the assumed causes of deterioration of the teeth, but for the most part the statements and hypotheses lack the features of rigorous proof that alone satisfy the curiosity of a scientifically minded person. At present the pendulum of opinion seems to swing between the claims of oral hygiene and appropriate diet, respectively, in the search for the sources of detriment. In either extreme, the lack of something is charged with responsibility for the dental damages. Thus, on the one hand, we are told that decay results from inadequate tooth cleanliness; and, on the other, the suggestion is ventured that the lack of some essential in the diet, such as calcium or some vitamin that promotes its deposition in osseous structure, is the primary cause of

abnormalities in the teeth. Recently a somewhat different interpretation of such conditions has become justified by observations of the injurious effects of undue quantities of certain elements in the diet. The inclusion of small amounts of fluorids in the diet, for experimental rats, has led to abnormalities in the structure and hardness of their teeth. Sometimes the latter have grown into abnormal positions and have shown unusual susceptibility to attrition. The quantities of fluorin that led to such an outcome were not sufficient to interfere seriously with the usual development of the animal. The point justly emphasized by the observers is, however, that nutrition investigations have dealt in most instances with the effects of deprivation, complete or partial, of some indispensable nutrient. The cause of defective structure and of low resistance to external agencies, which result in injury to the teeth, has frequently been attributed to deficiency of one kind or another in the food supply. The new study shows, on the other hand, that overingestion of an element that is regularly found in both food and tissues in small amounts may exert a detrimental effect when the amount ingested is increased to but little more than certain samples of foods are known to contain. This is a positive effect of significance in bone and tooth structure. Fluorin is known, in larger dosage, as an outspoken poison; but on the other hand, the presence of the element is reported by all analysts as characteristic of teeth and bones, and its widespread distribution in Nature makes exclusion of fluorid from the diet almost impossible in any practical way. Evidently there are limitations to the tolerance of even this ubiquitous element.—*J.A.M.A.*, June 6, 1925.

Dental Cyst from Devitalized Incisor: A case of dental cyst in the palate resulting from the presence of a devitalized lateral incisor is reported by A. M. Nodine (*Oral Topics*, July, 1925). The patient, a man, aged 40, had fallen when about 12 years of age, breaking off a small portion of his tooth on a stone step. For fifteen years thereafter, "gum boils" continued to form on the palate side of the tooth, but there was no pain. Three years previous to the present report, the tooth was extracted, as the condition was growing worse. The root was described as black and decayed. After extraction, pus continued to be discharged on pressure. A roentgenogram was interpreted as showing a considerable gap in the bone of the hard palate. Necrosis of the bone was diagnosed, and, under a general anesthetic, several small pieces of bone were removed. Improvement followed, but some fluid continued to be expressed on pressure and there was a bad taste in the mouth. Operation was advised and, after prophylaxis, procain was injected and incisions were made to allow for elevation of the gum from the palate. A large cyst extending up to the floor of the nose was removed, and, as it had caused absorption of bone about the cuspid, this too was removed. Several weeks after operation, marked improvement in the general health was noted. The author comments on the fact that the large gap in the bone was not at first recognized as a cyst and that removal of the alleged necrotic bone had no appreciable effect on the extent of persistence of the cyst.

Light and Health: The efficacy of sunlight in treating or rather in preventing disease has been known somewhat empirically for ages although frequently not carried into effect. That the value of sunlight and artificial sunlight or in its absence its artificial substitute is essential in preventing the development of rickets and bone tuberculosis is now generally recognized. The value of heliotherapy in many diseases of a bodily nature has been proved beyond peradventure. At the recent meeting of the Royal Institute of Public Health at Brighton, England, Sir Henry Gauvain, the chief medical officer of the Cripples Hospital and College at Alton, near London, read a paper, the joint production of himself and Mr. McRae, on the effect of sun and artificial light treatment on the mentality of patients. He advanced the interesting hypothesis that light represents a kind of "brain food" and supported that view by reference to tests carried out by Mr. C. R. McRae of Melbourne. According to the experience of Sir Henry Gauvain and Mr. McRae, proofs have been given that not only bacteriological infection is cured, as in the case of tuberculosis, but healthy tissue is actually built up by exposure of the body to sunlight or artificial sunlight by carefully regulated methods. Similar results have been attained in rickets; not merely has diseased bone been restored to a healthy condition but the growth of

new bone to strengthen the wasted tissue has been demonstrated. The authors of the paper, Sir Henry Gauvain and Mr. McRae, therefore think it is reasonable to suppose that by the use of similar methods other tissues also may be nourished and fortified. Is it not possible that the gray matter of the brain may be improved thereby? Indeed, they go further than suggesting that such may be the case, as they adduce in support of the suggestion the results of experiments, which, they hold, prove that greatly increased mental activity does follow upon exposure to sunlight under properly and scientifically carried out conditions. The workers at Alton observed again and again that sunlight treatment exercised a profound effect on the "spirits" of their patients and served to render them more capable of benefiting by the education provided for them. Of course, it is not contended that sunlight provokes any fundamental change in the brain for the better, but arouses its innate capacities to greater efforts in the same way as the food of the body, stimulated by sunlight, enables the organism to develop its powers of action. If these views are confirmed or even partially confirmed by further investigations, they will provide yet another argument in support of the contention that human material is wasted pitiably by the lack of sunlight. It is well known that insufficient sunlight results in stunted bodily growth and in the development of certain diseases. If to these calamities is to be added a third, impoverishment of mental capacity, then the time is overdue for the abolition of slums and smoke and dirt infested cities.—*Boston M. & S. J.*, July 16, 1925.

Relation of Eye to Teeth: A case of swelling and inflammation of the eye associated with a tooth condition is reported by A. A. Callaghan (*Dent. Sci. J. Australia*, July 1, 1925). The tooth, an upper left bicuspid, had been opened and its pulp removed, by another dentist, who, according to the patient, refused to go on with the treatment. No dressing or filling had been inserted. The author cleaned the canal and inserted a dressing, telling the patient to return the following day. He came back that evening, complaining of intense pain in the left eye, which was bloodshot and swollen. There were no signs of irritation about the tooth. Removal of the dressing resulted in cessation of the pain and the patient was sent home. The author determined to extract the tooth, but on the advice of a physician who had seen a similar case in which extraction resulted in loss of sight of the eye involved, extraction was given up, and another dressing was attempted, whereupon the swelling and pain recurred. The patient was dismissed with no further treatment. Later, the author suffered an intermittent inflammation of one eye, which was always associated with some discomfort in a devitalized bicuspid. This he finally determined to extract, whereupon the eye disturbance ceased. He concludes that extraction was probably the solution of the first case, although he questions the exact connection between the eye and tooth conditions.

Dentigerous Cyst and Adamantinoma: Morlet and Morlet describe a case of a tumor on the lower jaw which presented all the intermediate stages between a cyst and an adamantinoma. The case, they say, confirms the common origin of the two affections.—Presse Méd., abstr. *J.A.M.A.*, July 11, 1925.

Hospital Service for Dental Graduate: The hospital internship is suggested by S. L. Rosenthal (*Dent. Cosmos*, July, 1925) as one practical solution of the question as to how the graduate in dentistry can obtain more knowledge of general medicine and yet not take the time required to obtain an M.D. degree. Cooperation between physician and dentist proved of infinite value in many difficult cases. The presence of the dental intern assures dental care for all patients requiring it. Since physicians do not attempt to diagnose oral foci of infection, many cases are overlooked or the patients are discharged without relief. The intern gains a knowledge of the normal body and of general disease, forms valuable associations and gets much experience in purely dental work. A general knowledge of surgery and a wide knowledge of anesthetics are obtained. It is suggested that a year in the hospital could be substituted for a year of predental work, and that students be urged to take time for a short period of voluntary service in a hospital.

Difficulties in Anesthesia of Children: There is a type of child to which I particularly want to call your attention, because this type is peculiarly liable to react very severely to any slight shock—in other words, a type that has frequently and erroneously

been described as suffering from status lymphaticus. Now these cases, I believe, are clinically recognizable, but not as cases of status lymphaticus, for they are not such. There is no word that I know of to describe them, but after all words are not things but merely a device invented by human beings to describe meanings, and sometimes used to cloak them. My cases have nearly all been boys—indeed I have not seen a very definite case in a girl. These boys have the following characteristics: 1. Exceptional mental abilities. They are clever, industrious and precocious—at or about the top of their classes at school. 2. Obviously large heads with a big brain. 3. Unstable vasomotor systems—they readily flush or conversely suffer from marked pallor. Now when I see this type I advise that the greatest care should be taken to avoid shock. In particular, the anesthesia should be thorough and complete right through the operation, and the less that is done at one sitting the better, and even after nitrous oxid or ethyl chloride (which is best avoided altogether) the child should be placed in the recumbent position and kept there for at least twenty minutes. If N_2O is given, such an operation as the extraction of four six-year molars should on no account be attempted. Two at the most should be dealt with, or better still, only one. If it is advisable to do anything more extensive, ether is the anesthetic of choice, and the anesthesia must be complete throughout.—E. H. Drinkwater, in *Brit. Dent. J.*, June 1, 1925.

Rickets Developing in an Abundance of Sunlight: Léri comments on the sequelae of rickets in adults, especially the pain in the bones. It is frequently ascribed to a neurosis, since there are no other manifestations of rickets at the time. Among thirty-two adults with marked deformities from rickets, twenty-seven were agriculturists, one a sailor and only four resided in a city. He recalls that in Nice and Milan, where there is plenty of sunlight but the hygienic conditions are defective, the number of children with rickets is high. In his thirty-two cases, twenty-nine of the patients belong to large families, each of them having an average of six brothers or sisters. Eleven of the patients were the last or next to the last child in the family. Lack of proper care and of nourishing food, which may have occurred in these circumstances, are probably responsible for rickets appearing regardless of an abundance of sunlight.—*Bull. Soc. Med. d. Hôp., Paris*, abstr. *J.A.M.A.*, Aug. 29, 1925.

Health in Japan: In no other country, unless it be among the Eskimo, are children held in such high honor, among rich and poor alike. These round-faced jolly little youngsters, often barefoot, dressed in their flowery kimonos, look like little dolls. But field and factory, which claim so much of the vitality of the womanhood of Japan, reap additional harvest in the lives of the children; the child mortality rate in Japan is very high; out of every 1,000 deaths 350 are of children under the age of five. On the whole, however Japan has good medical care. Physicians and dentists flourish in the larger cities; and among the more ignorant classes the very belief in the power of ginseng to cure all ills, serves a good purpose. Patent medicines of home manufacture are unfortunately popular; and their advertisements can be found painted on the rocks some 1,500 miles up the Chinese rivers. Japan is an excellent field for the oculist; the years of study required to master the complicated system of writing makes an undue demand on the eyes. Yet there is a keen desire for learning among all classes and illiterates are rare in Japan.—*Pub. Health*, May, 1925.

Oral Spirochetosis: In a report based on personal observations made from the examination of a great number of smears taken from inflamed areas in the oral cavity, Lester R. Cahn (*Dent. Cosmos*, July, 1925), reaches the following conclusions: 1. While the spirochete may be a normal inhabitant of the oral cavity, it is found in great numbers about inflamed areas. 2. The spirochete acts as a constant irritating factor in keeping up a diseased condition, once it has taken hold of the tissues. 3. The best method of studying the morphology of these organisms is by staining with India ink. 4. This method reveals three distinct types morphologically. 5. The spirochete primarily attacks soft tissue, although it has been found in the osseous structures of the jaws and in the teeth. The spirochete is capable of bringing about a chronic inflammatory condition of the gums which resists almost all kinds of treatment. This condition is distinctive in characteristics and might be termed an oral spirochetosis.

Prevention and Cure of Rickets: We now know two methods of treatment which prevent or cure rickets. One method is to supply a diet rich in vitamin D, a substance which has been found most abundantly in cod liver oil, but also in certain other fats and in green vegetables. The other method is to irradiate the body with ultraviolet rays. Knowledge of these two preventives enables us to explain the very interesting facts in regard to the occurrence of rickets. The disease is found only in civilized communities, especially in large cities, where children are kept too much indoors, and are fed on a diet deficient in green vegetables and in other sources of vitamin D. In farming communities the disease is rare or unknown. Among savage peoples the children are, in general, free from it, because they are exposed to sunlight every day. The Eskimo baby is free from it, even though he lives in a dark hut, because he is suckled by a mother who consumes great quantities of animal fat and oil. The seasonal occurrence is explicable by its relation to vitamin D and to ultraviolet rays. For rickets is incurred mainly in winter, when the baby receives too little sunlight and the mother receives too little green food. The incidence of rickets among animals is similar to that among men: wild animals are free from it; domestic animals are subject to it. The disease of chickens known as "weak legs," which causes great losses to poultrymen, is either a form of rickets or something very similar to it. The symptoms are typical. At the age of three weeks the chick shows lack of vigor. At five weeks it has fully developed the "weak leg" condition: the toes are crooked, the nails long and curled; the legs are so weak that the chick cannot stand up, it crawls to its food with feet and wings, using the wings as a pair of crutches. Its bill is soft, and its plumage ruffled. X-ray photographs reveal a lack of calcium salts in the bones. If the disease is allowed to reach this stage the chick usually dies. Steenbock has shown that the disease of pigs which the farmers call "rheumatism," and which causes serious losses annually, is really rickets. Dogs, monkeys and rats also are known to suffer from rickets. The susceptibility of the rat is specially important, because rats are the most convenient animals on which to experiment, and a large number of experiments have been tried on them. Without these experiments, the knowledge which we now have of rickets and its cure would have been quite impossible.—Craig and Belkin, in *Scientific Monthly*, May, 1925.

Health of the Stomatologist: M. Lebrun discussed the pathology of the dentist, who, like other medical specialists, is exposed to many influences affecting his health which are due to professional factors. Lebrun considered the various affections, dwelling particularly on those that are due to standing long in the same position—digestive troubles and postural troubles, especially metatarsalgia.—Belgian Letter, *J.A.M.A.*, Aug. 29, 1925.

The Orthodontist and Medicine: The orthodontist should imbibe all the medical knowledge that he can digest as a part of his daily routine. Read medicine as it pertains to body growth; study the posture, feet, eyes and ears, clinical pathology and clinical psychology. In other words, do everything in your power to enable you to diagnose the pathologic condition of your patients at the time when they present themselves for treatment. This must be done if you hope to establish a normal healthy system and retain the teeth in their new positions in healthy bone.—Henry C. Ferris, in *Internat. J. Orthodontia*, June, 1925.

Dentistry and Obstetrics: Summary: 1. In avoiding the threatened complications of gestation, examination and care of the teeth must be regarded as one of the first measures in the prophylaxis of pregnancy. 2. Since a general deterioration of the teeth is often a concomitant of gestation, more care of them than ever is necessary during that period. 3. Such care, if undertaken with careful cooperation between the physician and the dentist, is an absolutely safe procedure. 4. If we are to safeguard properly the physique of the mother and the developing child (and this, from my point of view means particularly the teeth), the obstetrician must insist that the patient be guided more and more by his advice on diet.—H. S. Shulman, *Dent. Cosmos*, August, 1925.

Congenital Cleft of Lip and Palate: Early closure of the cleft lip is strongly advocated. The constant gentle pressure of the repaired lip upon the underlying bones unquestionably furthers their better alignment. No operator experienced in this sort

of work is materially hampered by it in subsequent work on the palate; at any rate, the advantage of an early closure outweighs the additional working space an unclosed lip may afford. The hare-lip operation should not be regarded as a trivial procedure, for an imperfect operative result remains to the final day conspicuously evident to mar a life's happiness and probably a career. Cosmetic success is largely determined by the operator's artistry in restoring the symmetry of nostril and vermilion border, in fashioning a full and pliable lip, and in minimizing the visible scar. To this end is advised the free separation of the lip from bony attachment, simplicity of incisions, economical paring of flaps, the plan to cut and fit as you go, and the careful placement without tension of the sutures.—Lee Kahn, in *Am. J. Surg.*, July, 1925.

Pathogenesis and Diagnosis of Hutchinson's Teeth: Buschke and Langer have found in patients with congenital syphilis and with typical Hutchinson's teeth that the premaxillary bone was hypoplastic and therefore the gums just above the teeth were concave. A similar process is found on the symphysis of the mandible. These findings lead the authors to believe that the peculiar shape of the incisor teeth in congenital syphilis is primarily due to the hypoplastic development of their bony matrix. The concave gum is diagnostically very significant, and does not occur in rickets.—*München. med. Wchnschr.*, abstr. *J.A.M.A.*, Aug. 29, 1925.

Actinotheraphy Applied in Dentistry: The following conditions are listed by A. L. Parsons (*Dent. Cosmos*, June, 1925), as yielding to treatment by actinotherapy: postoperative pain, gingivitis, stomatitis, pericementitis, pulpitis, spongy, bleeding gums, pyorrhea alveolaris, trench mouth, hypersensitiveness of the dentin and alveolar abscesses. The penetration of the short ultraviolet wave creates a leukocytosis, thereby raising the tissue vitality. Since the actinic wave is absorbed by the blood, the area to be treated must be dehematized, by the use of pressure, or by employment of cocain, procain or epinephrin. Pus when present must also be removed. Four cases of successful treatment of pain and swelling after removal of impacted molars are reported. All were marked by absence of odor, soreness, stiffness and discomfort, and in all healing was rapid.

The Doctor and Life's Actualities: The doctor is altogether a special kind of person. His illusions are few. His inside information is enormous, and if now and then he wears a superior smile, forgive him. He has probably just heard some remark which he knows to be fatuous or hypocritical. Again, his jokes are likely to be a bit technical, and his view of life materialistic. But if he has a brand of idealism, you can put your trust in it, for he has learned it in a hard school, and it is genuine. He has faced the worst, and can still believe the best. And if he has a religion, it will be worth coming at, for he wrested it out of the actual battles of good and evil in our common life seen at close range.—*Boston Transcript.*

Ether Anesthesia: The extractions over, all bloodstained towels, sponges, instruments, etc., are put aside where the patient will not see them, a clean towel is put under the patient's chin, and he is allowed to recover consciousness slowly and quietly. He should not be hurried back to consciousness, but allowed to drift to it. He should not be moved from the chair for at least a quarter of an hour. He should then lie down quietly in a darkened room, well covered up, and go to sleep. The most troublesome postanesthetic complication is vomiting. This will depend, to a great extent, on the amount of ether-laden blood and mucus which the patient has been allowed to swallow. If the saliva has been drained out of the mouth during induction, and if the mouth has been sponged out two or three times during the operation, the subsequent vomiting, if any, will be slight. In this case, the administration of eight to ten drops of adrenalin chloride solution (1 in 1,000) in a teaspoonful of water acts like a charm. If any considerable quantity of blood and mucus has been swallowed, it is better to make the patient drink a tumbler of warm water. A basin should be at hand, as the warm water will be vomited again almost at once, together with the contents of the stomach, and this will clear the stomach and afford relief. After an hour or two, the patient will find a cup of tea very refreshing.—F. W. E. Wagner, in *Dent. Surgeon*, June 27, 1925.

Eddyites Oppose Medical Examination of Motorists: "Organized Medicine Looking to Motorists for Revenue": thus the *Moni-*

tor, the daily published by the followers of Mrs. Eddy. It seems that the mouthpiece of this cult is opposed to the recommendation of the American Medical Association's Committee on Physical Standards for Drivers of Motor Vehicles. This committee urged that every person driving a motor car should be required to present evidence of good eyesight, such evidence to consist of a certificate from a reputable physician who has tested the vision of the individual. It is perhaps logical that a cult that declares that "the human mind and body are myths" should view with equanimity the appalling toll of life taken by automobiles in this country. Presumably Eddyism—officially at least—does not recognize the reality of errors of refraction, yet it is not among the least amusing things in this drab world to note the number of persons in any Eddyite church who wear glasses.—*J.A.M.A.*, June 27, 1925.

The Control of Rickets: That animals can be protected against rickets by the use of cod liver oil and ultraviolet light is an established fact. It has also been clearly shown that cod liver oil and sunlight exert a great influence in the cure of rickets. Whether these measures are sufficient to prevent rickets in infants in a community has been made a problem of investigation in New Haven. Martha M. Eliot, (*J.A.M.A.*, Aug. 29, 1925) describes the plan of the study and offers a preliminary discussion of the results. The demonstration was started in October, 1923, for a three year period by the United Children's Bureau in conjunction with the pediatric department of the Yale School of Medicine and with the active cooperation of the local health organizations. A district of the city was selected having a population of approximately 13,500, one-third of which were negroes, and two-thirds a mixed population composed of Italians, Irish, Polish and Americans. The office of the demonstration is known in New Haven as the "Children's Bureau." The staff consists of three physicians, three public health nurses, two social investigators, a roentgen-ray technician and a secretary. The main problem of the investigation was to show whether rickets could be prevented in a community by the intensive use of cod liver oil and sunlight. The infants born within the selected district during the first two years of the study are examined and started on cod liver oil and sunbaths, if possible, before the end of the first month of life. They are brought to the Children's Bureau once a month for physical and roentgen-ray examinations in order that rickets may be discovered as early as possible and intensive treatment instituted if necessary. The nurses visit the homes frequently to see whether the instructions are being carried out. These investigations have shown that a slight degree of early rickets is well nigh universal in our climate and in our state of society. The very intimate association of rickets with growth, its early appearance regardless of season, and its universality raise the question whether this slight degree of rickets must not be considered normal. That rickets is intimately associated with growth is well known, and that it should appear at the time when most active growth is taking place, namely, the first four months of life, is not extraordinary. The rate of growth of the infant influences the early development of the disease. Large rapidly growing breast-fed infants and very fat infants uniformly show definite evidence of rickets. It is an uncommon thing to find a healthy, vigorous breast-fed infant who does not show rickets by roentgen-ray examination. Premature babies, who grow exceedingly rapidly, are notoriously rachitic. Malnourished infants frequently show small, slender bones with little or no rachitic change. If any two groups of infants show the need of early antirachitic treatment more than others, they are the large, rapidly growing breast-fed infants and premature babies.

Hygiene and Common Sense: Hygiene is just common sense. If the dentist will treat it in that manner and make his patient see it in that light, hygiene will be a wonderful help in his greatest work—prevention—and for his most important patient, the child.—C. W. Hagan, in *Bull. Odontol. Soc. W. Pennsylvania*, September, 1925.

Carcinoma of the Lip: The following reasons are given by C. J. Broeman *(West Virginia M. J.)* for using radium in these cases: 1. A larger proportion of cases are cured with radium than with any other method. 2. There is no deformity, little loss of time, and the treatment is not painful. 3. Glandular metastases can be handled as successfully with radium as with the knife.

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Association of Oral and Plastic Surgeons, October 26-27, 1925, Philadelphia, Pennsylvania.

American Medical Association, April 19-23, 1926, Dallas, Texas.

International Orthodontic Congress, August 16-22, 1926, New York City.

Pacific Coast Dental Conference, June, 1926, Portland, Oregon.

Seventh International Dental Congress, August 23-28, 1926, Philadelphia, Pennsylvania.

STATE SOCIETIES

District of Columbia, at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

National Capital at Washington, D. C., first Tuesday of every month.

October (1925)

Florida, at Orlando (29-31).
Maryland, at Salisbury (12-13).
New England, at Boston, Mass. (15-17).
Susquehanna, at Wilkes-Barre, Pa. (19-21).

December (1925)

Nevada, at Reno (5).
New York, First District (2-4).
Ohio, at Columbus (1-3).

February (1926)

Minnesota, at St. Paul (10-12).

March (1926)

Louisiana, at New Orleans.

April (1926)

Alabama, at Birmingham (12-14).
Connecticut, at Bridgeport.
Kansas, at Wichita (19-21).
Michigan, at Detroit.
New Jersey, at Trenton (7-10).
North Carolina, at Richmond, Va. (13-15).
Virginia, at Richmond (13-15).

May (1926)

Illinois, at Springfield (11-13).
Indiana, at Indianapolis (17-20).
Maryland, at Baltimore (3-5).
Massachusetts, at Boston (3-7).
Missouri, at Jefferson City (17-19).
Montana, at Helena (26-28).
Nebraska, at Lincoln (17-20).
New York, at New York City (19-22).
South Carolina, at Columbia.
Tennessee, at Nashville.
West Virginia, at Clarksburg (17-19).

June (1926)

California, at Portland, Oregon.
Colorado, (17-19).
Georgia, at Savannah (9-11).
Maine, at Augusta (last week).
New Mexico, at Santa Fe (20).
Oregon, at Portland.
Washington, at Portland, Ore. (8-13).

July (1926)

Wisconsin, at Madison (14-16).

August (1926)

Pennsylvania, at Philadelphia.

November (1926)

Arizona, at Phoenix.

Chicago Dental Society, at Chicago, January 27-29, 1926.

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

California, at San Francisco, December 5, 1925. Secretary, O. E. Jackson, 155 Kentucky Street, Petuluma, California.

Colorado, at Denver, December 1-5, 1925.

Secretary, William H. Flint, Littleton, Colorado.

Connecticut, at Hartford, November 17-19, 1925. Recorder, Arthur B. Holmes, 43 Central Avenue, Waterbury, Connecticut.

Indiana, at Indianapolis, November 9, 1925. Secretary, J. M. Hale, Mt. Vernon, Indiana.

Iowa, at Iowa City, December 7-10, 1925.

Kansas, at Wichita, December 7, 1925. Secretary, George E. Burket, Kingman, Kansas.

Massachusetts, at Boston, October 7-10, 1925. Secretary, Joseph N. Carriere.

Michigan, at Ann Arbor, November 16-21, 1925. Secretary, J. W. Lyons, 617-21 Dwight Bldg., Jackson, Michigan.

Nevada, at Reno, December 9, 1925. Secretary, G. H. Marven, P. O. Box 56, Reno, Nevada.

North Carolina, at Raleigh, January 11, 1926. Secretary, F. L. Hunt, Asheville, North Carolina.

Ohio, at Columbus, October 26. Secretary, Ray R. Smith, 327 E. State St., Columbus, Ohio.

Pennsylvania, at Philadelphia and Pittsburgh, December 2-5, 1925. Secretary, Alexander H. Reynolds, 4630 Chester Avenue, Philadelphia, Pennsylvania.

Rhode Island, at Providence, November 17-19, 1925. Secretary, Albert L. Midgley, 315 Butler Exchange Building, Providence, Rhode Island.

Wisconsin, at Milwaukee, December 14-19, 1925. Secretary, S. F. Donovan, Tomah, Wisconsin.

FLORIDA STATE DENTAL SOCIETY

The next meeting of the Florida State Dental Society will be held at Orlando, Oct. 29-31, 1925.

H. G. Bow, *Secretary*,
Deland, Fla.

MONTANA STATE DENTAL ASSOCIATION, INC.

The twenty-third annual meeting of the Montana State Dental Association will be held at Helena, May 26-28, 1926.

J. E. Buehler, *Sec'y-Treas.*,
Great Falls, Mont.

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK

The First District Dental Society of the State of New York proposes to devote its December meeting to the application of science to practice. All meetings and clinics will be held at the Hotel Pennsylvania, Dec. 2-4, 1925. Write now for reservations. For further information, address

E. M. Davies, *General Secretary*,
250 West Fifty-Seventh St.,
New York City.

VIRGINIA STATE DENTAL ASSOCIATION AND NORTH CAROLINA DENTAL SOCIETY

The Virginia State Dental Association and the North Carolina Dental Society will hold a joint meeting in Richmond, Va., April 13-15, 1926.

J. B. Williams, *Sec'y-Treas.*,
Virginia State Dental Ass'n,
1000 West Grace Street,
Richmond, Va.

BOARD OF DENTAL EXAMINERS OF CALIFORNIA

The next examination given by the Board of Dental Examiners of California will be held in San Francisco, Dec. 5, 1925. For further information address

O. E. Jackson, *Secretary*,
155 Kentucky Street,
Petuluma, Calif.

COLORADO STATE BOARD OF DENTAL EXAMINERS

The next semi-annual meeting of the Colorado State Board of Dental Examiners will be held in Denver, commencing December 1 and continuing for five days. For further information, address

William H. Flint, *Secretary*,
Littleton, Colo.

CONNECTICUT DENTAL COMMISSION

The Connecticut Dental Commission will meet in Hartford, Nov. 17-19, 1925, to examine applicants for license to practice dentistry and dental hygiene and to transact any other business proper to come before them.

Attention is called to Chapter 95, Section

2900, amended as follows: "After July 1, 1925, every applicant for such license shall also present a certificate from the state board of education that he has completed a four year course at an approved high school, or has an equivalent academic education provided this requirement shall not apply to an applicant who shall have had at least three years' continuous practice as a legally qualified dentist, or shall have been a registered assistant in this state." This act shall take effect from its passage.

For further information, apply to

ARTHUR B. HOLMES, *Recorder*,
43 Central Ave., Waterbury, Conn.

IOWA STATE BOARD OF DENTAL EXAMINERS

The Iowa State Board of Dental Examiners will meet at the State University of Iowa College of Dentistry, Iowa City, Dec. 7-10, 1925, at 9 a. m., for the purpose of examining applicants for a license to practice dentistry in Iowa. An examination for dental hygienists will also be given. All papers and credentials must be filed with the department at least fifteen days prior to date of examination.

For further information and application blanks, address the State Department of Health, Capitol Building, Des Moines, Iowa.

KANSAS STATE BOARD OF DENTAL EXAMINERS

The next meeting of the Kansas State Board of Dental Examiners will be held at Wichita, the week of December 7, 1925.

GEORGE E. BURKET, *Secretary*,
Kingman, Kan.

NEVADA STATE BOARD OF ENGINEERS

The Nevada State Board of Dental Engineers will hold its next examination at Reno, beginning Wednesday, Dec. 9, 1925. All applications must be filed with the secretary not later than December 2.

G. H. MARVEN, *Secretary*,
P. O. Box 56, Reno, Nev.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

The next meeting of the North Carolina State Board of Dental Examiners will be held at Raleigh, beginning promptly at 9 a. m., Jan. 11, 1926. For further information and application blank, address

F. L. HUNT, *Secretary*,
Asheville, N. C.

PENNSYLVANIA STATE DENTAL COUNCIL AND EXAMINING BOARD

The next examination of the Pennsylvania State Dental Council and Examining Board will be held in Philadelphia and Pittsburgh, Dec. 2-5, 1925. The examination in theory will be held in the civil service rooms at City Hall, Philadelphia, and at the University of Pittsburgh, in Pittsburgh. The examination in practical work will be held at Temple University, Philadelphia, and the University of Pittsburgh, December 5, beginning at 8:30 a. m.

An examination for hygienists will be held at the same time and places.

Application papers may be secured from the Department of Public Instruction, Harrisburg.

For further information, address

ALEXANDER H. REYNOLDS, *Secretary*,
4630 Chester Ave., Philadelphia, Pa.

RHODE ISLAND BOARD OF REGISTRATION IN DENTISTRY

A meeting of the Rhode Island Board of Registration in Dentistry for the examination of candidates will be held at the state house, Providence, Nov. 17-19, 1925, beginning each day at 9 a. m. Candidates will present to the secretary of this board, at least one week before the examination, a written application on a form provided by the board, together with the examination fee of $20.

ALBERT L. MIDGLEY, *Secretary*,
315 Butler Exchange Bldg.,
Providence, R. I.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS

The Wisconsin State Board of Dental Examiners will hold its next examination at the Dental College, Marquette University, Milwaukee, Dec. 14-19, 1925.

For information and application blanks, address

S. F. DONOVAN, *Secretary*,
Tomah, Wis.

THE NEW YORK SOCIETY OF ORTHODONTISTS

At the next regular meeting of the New York Society of Orthodontists, to be held the fourth Wednesday in October (28), beginning promptly at 2 o'clock, at the Vanderbilt Hotel, New York City, the following program will be presented:

Demonstration of the Technic of the Construction of Labial and Lingual, Upper and Lower Appliances (in not less than three practical cases).

By Oren A. Oliver ..... Nashville, Tenn.

Recess.

Clinic Presenting Several Cases of Actual Appliances Used (with presentation of patients showing permanent results attained).

By Oren A. Oliver.

Manufacturers' Exhibit of Orthodontic Materials.

Manufacturers have been invited to be present at Dr. Oliver's clinic in order that they may cooperate in the manufacture of metallurgic supplies.

Dinner, 6:30 p. m.

Evening meeting, 8 o'clock.

CHARLES A. SPAHN, *Secretary*,
121 East Sixtieth St.,
New York City.

DENTAL HEALTH TALKS SPONSORED BY THE PUBLIC SERVICE COMMITTEE OF THE CHICAGO DENTAL SOCIETY

The Chicago Dental Society's Public Service Committee is planning a campaign of Dental Health Education, and for that purpose is training a class of twenty-five speakers. In order to secure material for the use of these speakers, $350 will be given in prizes, seven prizes of $50 each, for the best twenty minute speech suitable for presentation to the following types of audiences: grammar school children, high school pupils, parent-teacher audience, Kiwanis or Rotary Club audience, church audience, factory talk, employe audience, or radio talks.

Points to be considered are: simplicity of English, facts and suitability for specific audience.

Any contributor is eligible to write on any or all subjects. Write on one side of paper only. Place manuscript in envelope, with separate note giving name and address of sender. Writers agree that all material may be used by committee. All material should be in by November 1, 1925.

Address all mail to Dr. F. Blaine Rhobotham, Room 1406, Field Annex Building, Chicago.

HERBERT E. PHILLIPS, *Chairman*,
Sub-Committee on the Lay Education of the Public Service Committee of the Chicago Dental Society.

AMERICAN ASSOCIATION OF ORAL AND PLASTIC SURGEONS

The fifth annual meeting of the American Association of Oral and Plastic Surgeons will be held in Philadelphia at the Bellevue-Stratford Hotel, Oct. 26-27, 1925, coincident with the meeting of the American College of Surgeons. Members of the dental and medical professions interested in oral and plastic surgery are invited to the scientific sessions.

LEROY M. S. MINER, *Sec'y-Treas.*
153 Newbury St., Boston, Mass.

PATENTS RELATING TO DENTISTRY

1464250. Combination toothbrush and holder, Robert H. Lieberthal, Bridgeport, Conn.

1463900. Anchorage for artificial teeth, Frederick Maeulen, Rahway, and G. N. Van Allen, Newark, N. J.

1463963. Root-canal point, George L. Miller, St. Louis, Mo.

1463968. Denture, Jacob Petry, Pittsburgh, Pa.

62850. Des., Dental fountain cuspidor, Abraham Pflantzer, New York, N. Y.

1464013. Dental floss holder, Ferdinand C. Roberts, Detroit, Michigan.

1464644. Removable denture, Herman E. S. Chayes, New York, N. Y.

1464807. Dental instrument, Michael J. Clark, Homestead, Pa.

1464632.—Tooth separator, James W. Ivory, Philadelphia, Pa.

1464636. Dental casting machine, Samuel L. Jeffries, Gaffney, S. C.

1464657. Dental casting machine, Samuel L. Jeffries, Gaffney, S. C.

1465340. Apparatus for reducing secondary radiation from Roentgen rays, Arthur W. Buck, St. Louis, Mo.

Copies of above patents may be obtained for twenty-five cents each, by addressing John A. Saul, Solicitor of Patents, 509 Seventh St., N.W., Washington, D. C.

THE ODONTOGRAPHIC SOCIETY OF CHICAGO

Announces a Debate Between

DR. WESTON A. PRICE, D.D.S., OF CLEVELAND, OHIO,

and

DR. JOHN P. BUCKLEY, D.D.S., OF HOLLYWOOD, CALIF.

on the subject

"RESOLVED: That Practically all Infected Pulpless Teeth Should be Extracted."

Dr. Price will present the affirmative; Dr. Buckley, the negative.

The debate will be held in the Grand Ball Room, 19th Floor, Hotel LaSalle, Monday evening, October 12, at 8 o'clock sharp. Dr. C. N. Johnson, presiding.

This subject is probably the most important confronting the medical and dental professions today. The debaters are internationally known and are particularly gifted in their ability to defend their positions. Each debater will be allowed forty-five minutes to present his views, and fifteen minutes for rebuttal. At the conclusion of the debate, the result will be left to and determined by a vote of the audience, based upon the argument as presented and not upon preconceived ideas.

This meeting and debate will undoubtedly be one of the most important dental meetings ever held, and the result will prove a guide to physicians and dentists and will result in a benefit to humanity.

DINNER

A dinner immediately preceding the debate will be held at 6 o'clock sharp. Members of the medical and dental professions in general, and of the Illinois State and Chicago societies are cordially invited, both to the dinner and to the debate. Price of dinner per plate, $2.00.

Remember the date: Monday evening, October 12.

HART J. GOSLEE, *President*
P. B. D. IDLER, *Sec'y-Treas.*
C. E. MEERHOFF, *Program Committee.*

Right Here You Benefit

By Ernest V. Madison

THIS journal, in common with other leading American publications, prints an advertising section in each issue.

These advertisements stimulate progress in the dental field. Manufacturers advertise the improvement in their products. Other manufacturers are thereby brought to their tip-toes in an effort to equal these achievements or further improve on them.

These advertisements bring a lower selling cost on what you buy. By reaching a national multitude of readers, they give to the manufacturer an unrestricted market, larger sales and a lower cost of manufacture. In these days of intense competition, manufacturing economies are applied toward a reduction in the selling price.

These advertisements bring equal opportunity to all readers of this journal, regardless of geographical location. Through them, the reader in Oklahoma or Oregon is in as close touch with progress in the field as are readers in Ohio and in New York.

Advertisements are your friends. Cultivate the friendship of those in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION, for it is an alliance that will *get you there.*